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THE CENSUS OF INDUSTRY.

THE best fighting force in the world is useless without arms, ammunition, food, clothing, medicines and transport. It is with these facts in view that the Committee on Industrial Preparedness of the Naval Consulting Board of the United States is taking an inventory of the resources of manufacturers of such lines as would be needed in war. It is also planning for the development of increased efficiency in lines that are not up to the requirements.

Many factories whose products cannot be considered war necessities, have machinery easily adaptable for the production of war materials. A part of the comprehensive plans of the commission is to make these potential forces practical. It is proposed that the normal requirements of our army and navy be so divided and distributed that every plant capable of such manufacture be given a share at cost, plus a reasonable profit. If these requirements are not sufficient for this purpose, such goods as would not deteriorate might be made and stored for later, or emergency, use. In order to encourage those factories which are not now making war materials, they may be given sufficient orders to justify adapting enough of their present equipment, and training a portion of their help, to such manufacture, so that they will have a practical knowledge of such work, and can quickly turn over more of their machinery, and instruct a larger proportion of their help, to greatly increase their output of these lines should occasion demand.

Every rubber mill is now, or could be quickly equipped with the machinery needed to furnish necessary material for use in time of war. The proofing of fabrics for tents, ponchos, ground sheets, etc., and of textiles for balloons and aeroplanes; the preparation of hospital sheetings; the manufacture of druggists' and surgical sundries; the making of automobile truck tires, and the production of footwear and insulated wire are all regular lines of the rubber industry which would be called for in case of war.

As a preliminary move, rubber manufacturers are being requested to supply answers to a series of questions regarding their business for the industrial inventory. This information is to be held strictly confidential, and the work is non-partisan, non-political, and wholly patriotic.

Among the questions to be answered are the names of officers, principal stockholders, and directors, and whether each of these is an American citizen, and if not, what is his native country. Much detailed information is requested as to the value of land, buildings, machinery, tools, equipment and merchandise; a full description of the plant, with its ground plan and total floor areas; with a list of apparently non-pertinent questions as to feeding, housing, and caring for employes, the number of the latter and their nationality; whether they are union or non-union, whether the work now done by men could be done by women; kind and amount of material used, and from whom purchased; principal products manufactured, and amounts; where and how marketed, details of shipping, etc.

The form supplied for recording all this information is rather formidable. Were each manufacturer able to answer the questions offhand it would be a task of considerable size. This, however, will be attended to by volunteer workers, trained men of technical education.

No doubt the rubber trade will respond freely and fully, and—this for a guess—it will be found already equipped with men and machinery capable of furnishing supplies faster than men could be recruited to use them.

A PROTEST FROM LONDON.

THE increase in purchases of crude rubber in the Far East by representatives of American manufacturers for direct shipment to this country is viewed with some alarm by English rubber interests.

A recent issue of the "Financier" thus sums up the situation: "America uses about 90,000 to 100,000 tons of rubber a year. With the increase of mechanical traction, this quantity within the next few years, will probably be trebled. Towards this consumption of 100,000 tons, London exported to the States—according to the official sattistics—no less than 40,000 tons. The whole of this business is directly affected if the Rubber and Tin Exports Committee continues its present policy. Let there be no illusion upon the subject. If this great trade is, during this time of stress, allowed to pass from our hands, it will never be regained."

The writer contends that no national purpose is being served by the policy adopted by the exports committee, and its efforts to prevent rubber reaching enemy hands are resulting in a very maximum of damage to British trade interests, with no corresponding advantage. He quotes from "a well-known authority" as saying "To help the Americans to obtain control of an essentially English industry is not to beat the Germans, and, as a matter of fact, it will suit German-Americans far better to buy in the East than to have to come to London for their supplies."

The "Financier" claims that there are 10,000 tons of rubber in England, besides cargoes unloading from the Far East, so there is no question of shortage; and furthermore, that this condition has brought about the recent decline in the price of rubber, and the consequent effect upon Eastern exchange; and that the whole rubber trade is demoralized by the existing uncertainty. The article suggests that "the sooner the Rubber Growers' Association and the Rubber Trade Association bring pressure to bear upon the committee to secure a more enlightened policy, the better for the present and future prospects of the rubber industry. It may be that these august bodies have already moved in the matter. If this be so, and a redress of grievances is not speedily obtained, it is to be hoped that they will jointly put forward an official remonstrance on the subject."

At first blush it would seem as if London had no reason for this protest—that she stood in the place of an expensive middleman who could and should be eliminated with speed and despatch; that if rubber sold in Singapore and bought in New York were held up by London, it might as justly be held up also by other English ports as Penang, Colombo, Aden and Port Said. Such reasoning would, however, fail to take into account the important service rendered in making the present plantation industry possible. Through the most generous financing, and broad gage handling, the great producing plantations in the Far East were created and brought to their present productiveness. London was more than a partner; it was a wealthy elder brother with wide open purse.

Then, too, the work of the Rubber Growers' Association, of the greatest value to the planters, always centered in London. The London crude rubber men in the past have been singularly fair and impartial, but with the great growth of the Singapore market there is bound to be a readjustment in selling and shipping. London might hinder direct shipments for a time, but would it be best for all concerned? The better the producers of plantation rubber treat their biggest and best customer, the tighter that customer will stick. The cheaper the rubber, the greater the market.

THE STRIKE EPIDEMIC.

THIS is a time of unrest in the industrial world. It is a rare day when the morning news does not include the institution of a strike in some large factory. This is a result of present productive prosperity. The European war requires tremendous amounts of munitions, arms and supplies, while the call to arms of millions of artisans in Europe causes an increased demand for American goods to fill the scarcity of foreign manufacture. There is an almost unprecedented demand for labor, skilled and unskilled. The industries in greatest need of workers naturally offer high wages, and thus draw to their establishments employes from other factories. To hold their help these latter must increase the pay, and then workers in other plants, not thus affected, become dissatisfied, and demand equally high compensation.

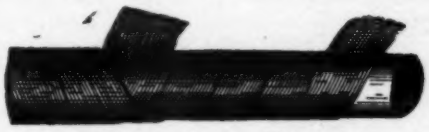
No line of manufacture is free from this disaffection of employes. The rubber trade is no exception. Generally speaking, rubber workers are paid as liberally as are most others for labor requiring equal intelligence, strength and skill. Some of the leading rubber manufacturing concerns have voluntarily increased the wages of their workmen. Others have granted full wages for a shorter working day. Some strikes have been settled by granting the full demands of the workmen. Others have been compromised.

But the present industrial prosperity cannot last indefinitely. When this war is over—and it must end some time—reaction must inevitably follow. Then, with a total cessation of demand for labor in many of these great munition factories, and a lessened call for products of other establishments, many thousands of workers, skilled and unskilled, will be thrown out of employment. And, as is the case with merchandise, so it is with labor, less demand and oversupply must result in a readjustment downward of the wage scale of today.

Cord Tires and Cord Tire Fabrics.

MODERN cord tires owe their origin to the thread fabric invented by John T. Palmer and first used in racing tires on bicycles in 1893. That Thomas J. Jeffery was first in the field with a thread fabric tire as claimed by some, cannot be verified, but it is true that fabric bicycle tires were made at Indianapolis by the G. & J. Tire Co. in the early nineties.

The name "cord" tire originated in England, where the principle was first applied to the manufacture of automobile tires in 1900. It was known as the Palmer cord to distinguish it from the lighter Palmer cord bicycle tire. The Silvertown cord tire



PALMER THREAD FABRIC.

was invented and patented by Christian H. Gray and Thomas Sloper of England, and manufactured at Silvertown, England, by the Palmer Cord Tire Co., and in the United States, under license, by The B. F. Goodrich Co.

THE SILVERTOWN CORD TIRE.

In this tire, the cords are built up from units of 24 threads that are separately impregnated with rubber and subjected to uniform tension. They are then cabled and the foregoing operation repeated until cords of the required sizes are produced, which are flattened in a machine specially constructed for the purpose. The two layers of these flattened cords are applied in the following manner: First, a layer of rubber is applied to the core—set in the tire building machine. A series of metal staples, 300 in number, are then placed at spaced distances around the inner edge of the bead ring. The cord is fed from a supply spool to a tension governor which regulates the de-

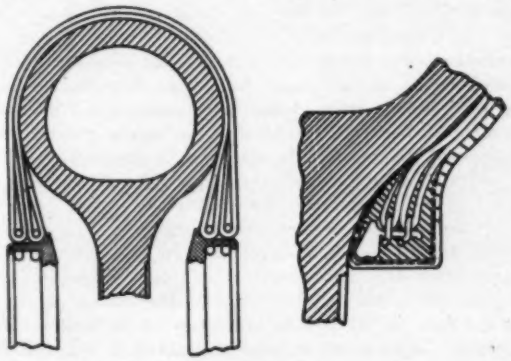
SILVERTOWN CORD.

livery and maintains a reserve supply under uniform tension. A folding device measures off an exact length of cord and folds it into double loops which are seized by automatic fingers and placed diagonally on the core and, at the same time, on the bead staples. At the anchorage or smaller circumference of the tire the cords are arranged on edge, and as they approach the tread or larger circumference of the tire each cord is given a quarter twist so that it lies flat on that part of the core corresponding to the tread. When one complete layer is placed around the core, a layer of rubber follows, over which a second layer of cord is applied in the same manner as the first but at the reverse angle. Then another layer of rubber follows which completes the carcass.

THE DICKINSON CORD TIRE.

The principles embodied in this tire and the machine for constructing the carcass show effort on the part of the inventor to improve the art and practice of cord tire making. The separate strands of which the cords are composed are thoroughly impregnated with rubber which penetrates to the finest fiber. Thus a bond is created, not only between the cords but between the individual fibers of which the cord is composed, thereby preventing friction within the cord itself or between the separate cords. These are formed originally in flat section, the initial strength being retained; and the possibility of breaking the yarn fibers by application of pressure is obviated.

The cords are laid to a true helix under uniform tension on the tire core by a new automatic machine, in such a manner that the full area represented by the variable circumference be-

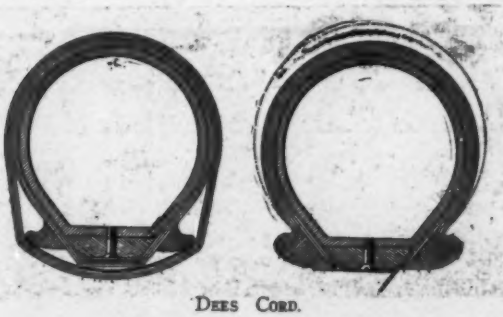


DICKINSON'S CORD.

tween the bead and tread is covered without packing, twisting, or distorting the cords. The cord loops are firmly anchored around the annular bead rings which are subsequently built into the carcass, thereby retaining the relative positions of the cords throughout the process of building and vulcanizing the tire. This method of construction permits curing the tire on the core, and therefore no distortion in the carcass occurs through the necessity of removing the core before a permanent bond is created between all the cords by vulcanization.

DEES CORD TIRE.

The Dees cord tire is built up on another new type of cord laying machine. The tire core is revolved and the rubberized threads are wound around it by a rotary winder in the form of a reel that carries the four thread bobbins and also the rubber solutioning cylinders. The threads are first impregnated with



DEES CORD.

rubber solution and then passed through rubber dough under pressure. They are then wound under tension around the core from one set of bobbins diagonally in one direction while the other ply from the other set of bobbins is wrapped diagonally

in the other direction, thus the threads of the two plies cross each other.

When the core has turned one complete revolution it is covered with a double ply of oppositely placed diagonal threads. Separator rings are applied to certain parts of the carcass and the thread winding operation continued. The separators prevent the different plies from sticking to each other so that the bead rings can be inserted and the carcass structure severed on the inner circumference in forming the beads and completing the casing.

WOVEN CORD FABRIC.

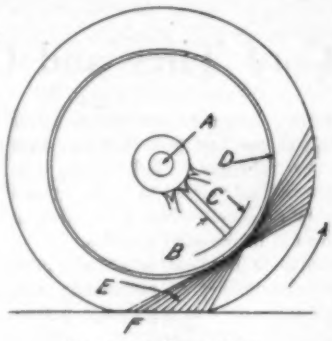
It can be safely said that with few exceptions, notably the Goodrich Silvertown cord tire, all cord tires now in use are made from a modification of the well-known thread fabric used in making hose pipe bicycle tires. It is composed entirely of cabled, parallel warp cords laid close together and without the usual filler other than small threads of soft, light yarn, spaced about one-half inch apart, that act as fillers but are only a temporary support to the web. In fact, the usual practice is to inflate an air bag within the unvulcanized casing that results in each cross thread being broken before the casing is finally cured.

Thirteen and one-half-ounce Sea Island fabric is generally used for the average cord tire, although 16½-ounce is recommended when size and excessive strain are factors to be considered. The fabric is coated on a spreader which applies several coatings of rubber to both sides of the web, the thickness of the solution and the number of coatings depending on the size and service required of the tire carcass. The spreading process not only impregnates the separated cords but preserves their alignment, which would be impossible in calendering. The fabric thus frictioned is skim-coated on the calender and then cut on the bias into strips of the required width and length. Thus it will be seen that all air is expelled from the fabric and the individual warp cords are imbedded in rubber, thereby reducing to a great extent the friction and consequent heating when the tire is subjected to air pressure and unusual strain due to fast driving.

There is apparently a limit to the size of the cord that can be successfully rubberized in cord fabric form. When the attempt was made to use a heavy warp cord in order to make up for the several plies made necessary by the use of lighter cord, the result was a failure, as the rubber could not be satisfactorily driven into the heavy 28½-ounce cord fabric.

PALMER'S FLAT CORD.

A development that grew out of the recognized imperfections in round cord, is a new type of ribbon or flat cord approximately one-half inch wide. According to John F. Palmer, these inextensible flat strips can be placed on the tire core at a true tangent to the rim, that is, at right angles to the spokes of the wheel.



PALMER'S IDEAL TIRE.

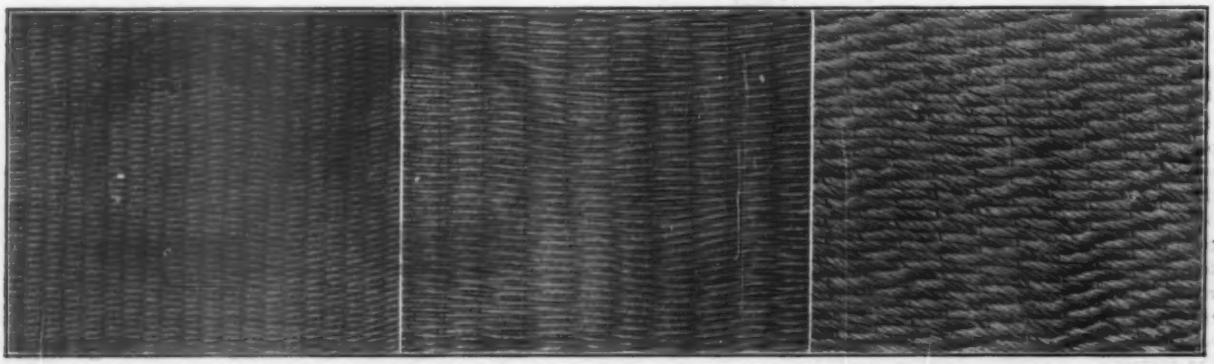
This position gives the most efficient power transmission from the rim to the tread for the reason that force is best transmitted in straight lines. The illustration shows how the cords are tangent to the rim in the ideal flat cord tire. *A* represents the axle; *B* the spokes; *C* the felly and *D* the rim. The cords *E*, form a bridge construction supporting the tire at *F*.

SUBERS' CORD FABRIC.

The inventions of Lawrence A. Subers follow closely along the lines of the cord principle in the development of a new laminated fabric that depends on a flat tubular fabric building strip. Moreover, the mechanical method of constructing the fabric is novel in principle. The fabric is made up of tubular bands, impregnated with rubber, that have alternating wide and narrow portions so that when it is made up in the form of a casing the wide portions will correspond to the tread and the narrow portions to the sides of the tire adjacent to the

SUBERS' CORD FABRIC.

beads. The fabric is laid, not braided nor woven, around an endless tubular mandrel corresponding in cross section to the general shape of a tire, by a machine that lays the strip around the moving mandrel at an angle of 45 degrees, while another layer of strip is simultaneously laid at opposite angles, forming a laminated tubular fabric. This fabric is slit on the inner circumference and removed from the mandrel in continuous lengths. These strips are of the correct width and shape to form the various plies of the tire carcass, which is built up on a separate machine.

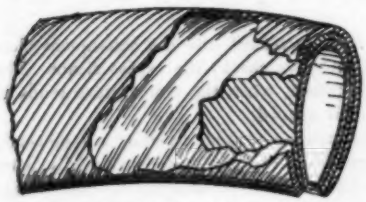


13½ OUNCES. 16½ OUNCES. 28½ OUNCES.

THREE TYPES OF CORD FABRICS.

LISTER'S CORD FABRIC.

Lister's tire fabric strip is made up of two layers of spirally wound rubberized cords, with the cords of one layer laid at an angle to the cords of the other layer and an intermediate layer of rubber formed by a spirally wound strip of rubber. The fabric strip is formed on a machine having a traveling core composed of an endless chain of segments of the same cross section as the finished tire. The tubular strip thus formed is cut on its inner periphery, forming an open tube which is ready to be applied to the core of a tire building machine.



LISTER'S CORD FABRIC.

THE UNITED STATES "ROYAL CORD" TIRE.

The fabric used in the United States "Royal Cord" tire is woven with very strong warp and light, soft filler threads, the latter spaced about half an inch apart and serving only to hold the web in position during the preparation of the carcass. The rubber that is applied to the fabric and between each ply, forms a covering about each thread in such a way, that when the tire is completed, no thread touches nor chafes against another, and each thread bears its full amount of the inflation and strain.

In the manufacture of the "Royal Cord" tires, the fabric is first impregnated, so that all of the individual threads are thoroughly covered with rubber. By a special frictioning process, the spaces between the threads are then rubber filled, and, lastly, the surface is skim-coated with rubber. The tires are then built up on a core in the usual manner.

THE GOODYEAR CORD TIRE.

In the Goodyear cord tires a series of hard cabled parallel cords, without any cross weave other than the web-supporting threads, are imbedded in rubber in the usual way. The resultant fabric is then cut into bias strips and laid up on the tire core by the Seiberling-Stevens-State tire building machine.

GOODYEAR CORD FABRIC.

FUTURE OF THE CORD TIRE.

At present the cord tire is used only on large cars, the high cost of Sea Island and Egyptian cotton limiting its field. It is said, however, that cheap and satisfactory tires made from Peeler cotton are a possibility, which would give the small car owner an opportunity to use them.

An indication of the present importance of the cord tire in the American trade is the prediction that 2,000,000 will be made during the coming year.

TIRE WEAR AND THE DIFFERENTIAL.

Whether the differential is necessary or only advisable on motor trucks is a subject of discussion in manufacturing circles. Some claim that though the present differential is far from satisfactory, it is a necessary evil, and it would not be wise to discard it. It is pronounced a heavy and expensive mechanism, which increases the cost of manufacture, of operation and of maintenance. But as regards wear of tires, there is not the slightest doubt that any vehicle not provided with a differential must give unequal wear on the tires, so much so, in fact, that even with all its objections, the differential is still an economizer in maintenance.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless, they are of interest, not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[179.] Names of concerns handling guayule shrub are desired.

[180.] A correspondent wishes to secure one or more rubber trees of No. 1 quality for green-house novelty.

[181.] Names of manufacturers of "rubber foam" have been requested.

[182.] A foreign rubber manufacturer contemplates making tires and desires complete information on the subject.

[183.] An inquiry has been received for inner tube testing machines.

[184.] The name and address of a firm making and selling hard rubber beads is solicited.

[185.] Information regarding a solvent for balata is requested.

[186.] A correspondent desires the names of manufacturers of sponge rubber.

[187.] Makers of machines for covering metallic wire with rubber are sought.

[188.] A correspondent asks where wool and cotton flock can be obtained.

[189.] The name of a manufacturer of a machine for cutting designs in tread molds is requested.

[190.] Names of companies making aniline dyes suitable for rubber compounds are requested.

[191.] An inquiry has been recevied for a firm manufacturing rubber tile and interlocking rubber tile.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

An applicant in Spain desires to represent American manufacturers of india rubber goods. Report No. 21,273.

An inquirer in Norway would like to be placed in touch with American exporters of india rubber for dental purposes. Report No. 21,322.

A firm in Argentina wishes to receive quotations, descriptive catalogs, etc., from American manufacturers of rubber tubes for oxygen and acetylene gas under pressure, asbestos gloves, etc. Report No. 21,390.

Commercial relations with American manufacturers and exporters of rubber articles are desired by a firm in the Far East. Report No. 21,406.

An agent in the United Kingdom desires to communicate with an American manufacturer who can supply a loom or machine for weaving elastic hosiery, elastic abdominal supporters, etc. Report No. 21,409.

A commercial organization in Russia requests the names of American manufacturers of rubber erasers. Report No. 21,418.

Representation of American manufacturers and exporters of hospital supplies in rubber goods is sought by a firm in Italy. Report No. 21,419.

A firm of commission agents in Brazil seeks commercial relations with American manufacturers and exporters of rubber tires and other rubber goods. Report No. 21,471.

Representation of American manufacturers of surgical rubber goods is desired by an applicant in France. Report No. 21,590.

Automatic Control of Time, Temperature and Exhaust in Tire Vulcanizers.

PERFECT vulcanization is the final achievement in the many important steps that are necessary in making automobile tires. A uniform curing temperature is vitally essential in the production of a guaranteed product. Dependence on the carefulness and experience of an operator invariably challenges the well-known fallibility of human skill, and an automatic control that neither forgets nor becomes tired and careless is incomparable.

Such devices are doubtless well known in general to the trade; however, the following description of the principle and methods of operating that are characteristic of the Tagliabue system will be of undoubted interest. The operating principle of these controllers is embodied in the primary parts that are described in the following text and illustrated in Figure 1: A capsular spring which expands and contracts in direct ratio with the temperature tendency within apparatus to which controller is attached; a transmitting lever for multiplying and transmitting this movement; a ball valve which is operated by the transmitting lever and which allows more or less air pressure to open or close the steam valve to a greater or lesser extent; air inlet and outlet connections for the air pressure which does the actual work of regulating the steam valve.

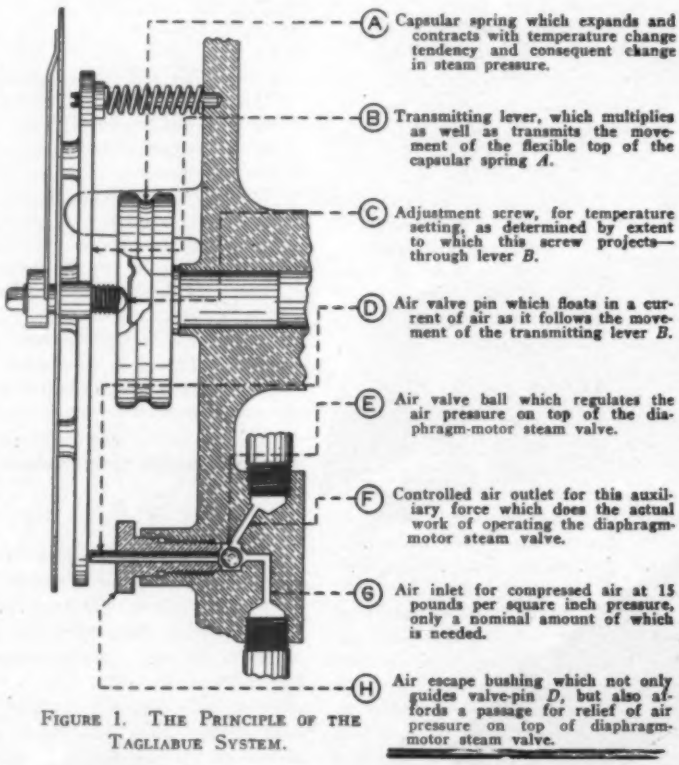


FIGURE 1. THE PRINCIPLE OF THE TAGLIABUE SYSTEM.

The capsular spring *A* is a phosphor bronze shell with a flexible top that when a temperature controller is involved is connected by flexible tubing with a thermostatic bulb, partly filled with ether. When the bulb temperature varies, the pressure of the vapor above the ether varies in accordance and moves the top of *A* in response to the merest tendency toward a change at the bulb. In the case of a pressure controller the capsular spring is directly connected to the controlled steam pressure.

The transmitting lever *B* is provided with an adjusting screw at the point where it contacts with the capsular spring. Advancing or withdrawing this screw, in connection with a dial and pointer arrangement, provides an ideal adjustment for higher or lower temperature maintenance.

The ball valve is extremely simple; it is sensitive and positive because frictionless and self-cleansing. When the temperature tends to go too high the consequent slight expansion of the capsular spring *A* and the resulting movement of the transmitting lever *B* allow the valve stem *D* to move upward. This increases the opening for the incoming air, which enters through *G*, and restricts the opening for the air which escapes past the pin *D*. Thus the air pressure on the diaphragm-motor steam valve, through passage *F*, is increased, and the consequent closing movement of the steam valve checks the excess steam. The opposite effect occurs, of course, when the temperature tends to diminish and more steam is needed.

The compressed air affords an instant, flexible and powerful means for doing any amount of work required, especially when the steam temperature shows a mere tendency to change and when, therefore, the capsular spring moves only an infinitesimal extent.

The actual operation of the Tagliabue control system applied to a tire press is briefly as follows, with reference, however, to Figure 2:

Figure 2 shows a tire vulcanizing press to which the following Tagliabue units are applied. The first is a compound controller which consists of two controllers housed in one case. One of these controllers maintains a uniform steam temperature within the press, while the other portion of the controller takes care of the exhausting or venting at the bottom of the press by periodically and frequently relieving the heater, not only of the water condensation, but of the supersaturated steam also. Another controlling unit is the automatic time controller which, after the vulcanizing period is at an end, automatically shuts off the steam supply and opens the exhaust wide. This can also be arranged to turn on cold water for flooding and cooling the contents of the press when desired. At the same time this controller rings a bell, or otherwise signals the operator, that he may know the heater is blowing off and be ready to open and re-charge it with the least waste of time. Another unit is the recording thermometer, which gives a graphic record of just what the controllers have accomplished in the way of uniform temperature maintenance, the final units being the mercurial thermometers, which serve as a check on the recorder.

Assuming now that the operator has charged the heater and is ready to start the cure, he first steps up to his time controller and by means of the setting key turns the hand clockwise from the starting point to the exact time period required for the cure. Then he opens the hand valve which is between the steam supply source and diaphragm motor valve *B*, shown in the "Side View Showing Arrangement of By-pass." Steam now enters the heater and the hand of the time controller *K* will commence to travel backward, or counter-clockwise. At the start diaphragm-motor valve *B* will be wide open, but will gradually close as the temperature builds up within the heater until finally it will assume the exact throttling position required to maintain

the temperature for which the controller is set. When the steam first enters, it has little effect on the thermostatic bulb of the temperature controller *E* because of the rapid condensation, but as the molds heat up, the condensation becomes less and the thermostatic bulb transmits the temperature effect to the capsular springs of the temperature controller. This gradually expands and moves the transmitting lever within the controller, causing more and more compressed air to flow to the diaphragm-motor valve *B*, which assumes the throttling position mentioned. Should the steam pressure in the header *A* increase, causing the temperature within the heater to go higher, this effect is instantly transmitted to the controller, and more compressed air is allowed to enter the top of diaphragm motor valve *B*, which will close, thus checking the rise in temperature. If, on the other hand, the steam pressure within header *A* falls, the reverse will occur and the diaphragm motor valve will open wider.

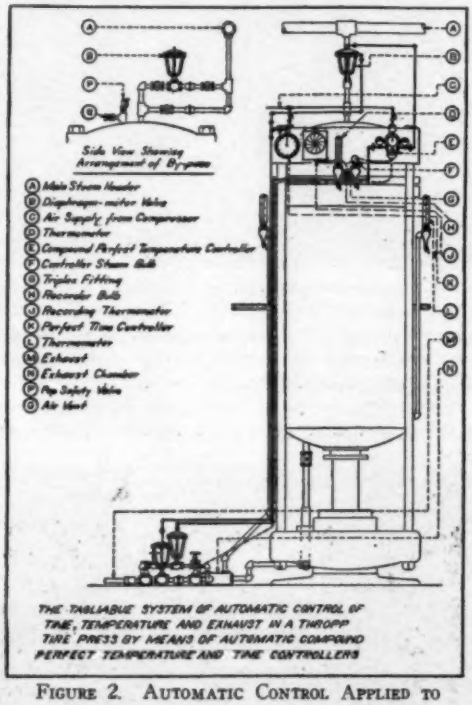


FIGURE 2. AUTOMATIC CONTROL APPLIED TO VERTICAL HEATER.

In the meantime the exhaust control portion of the controller *E* is intermittently draining the heater, because, as the condensation or the supersaturated steam, which is at a lower temperature, comes in contact with the thermostatic bulb of the latter it causes the diaphragm motor valve on the exhaust line to open, and the steam within the heater will eject the water and supersaturated stream. But when dry steam contacts with the thermostatic bulb it will cause the diaphragm-motor valve to again close. This occurs periodically during the vulcanizing period. During this time the hand of the time controller *K* has been slowly returning to the starting point. When the time is finally up this hand trips the time controller mechanism and compressed air, flowing through the time controller, with shut off diaphragm-motor valve *B*, the steam inlet valve. At the same time compressed air flowing to the "reverse acting" diaphragm-motor valve on the exhaust line will cause the latter to open wide, allowing all of the steam left within the heater to be vented out. In addition, as already mentioned, the operator is signaled so that he can unload the press and get ready for another cure.

The time controller can also be arranged, although it is not thus shown in Figure 2, so that it will cause a third diaphragm-motor valve to open wide when the vulcanizing period is up, and cold water will flood the heater until the operator shuts off the water supply.

The water of condensation settles in the exhaust chamber *N* in Figure 2. This chamber has two outlets, as shown, each of which is provided with a diaphragm-motor valve, one of said valves being a direct acting and the other a reverse acting valve. The direct acting valve opens when the compressed air pressure is relieved and closes when the air pressure enters the top. This valve is in connection with the exhaust control part of the compound controller shown at *E* in Figure 2. When the temperature gets low this valve opens, thus venting the heater until dry steam comes in contact with the thermostatic bulb. The reverse acting valve mentioned is connected to the time controller, and, being reverse acting, remains closed while there is no air pressure on the diaphragm top. When, however, the time controller functions, and allows air to pass and flow to the top of this reverse acting diaphragm-motor valve, it opens wide and thus blows off the apparatus when the time period is up.

The same arrangement of units can be applied to a horizontal vulcanizer, used for curing treads, inner tubes or the open cure process. The functioning of the different units is exactly the same as already described.

THE CONCENTRIC WIRING SYSTEM.

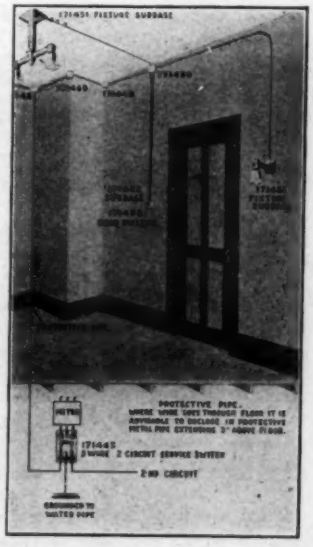
There are in almost every city numbers of small houses which the owners will not have wired because the standard forms of wiring are more or less expensive, and with present methods of wiring it is necessary to disturb the wall decorations to obtain neat installations.

Rubber insulated wire of special construction, intended to be installed on the surface of the wall and to be covered with paint or paper, has been devised for wiring inexpensive houses.

CONCENTRIC WIRE.

Bare concentric wire, so-called, has a single, rubber-insulated, solid wire for its inner conductor. The outer conductor, or sheath, is composed of tinned sheet copper, folded longitudinally around the wire with a full lap, giving uniform, double thickness. The laps of the sheath are then soldered, forming a continuous water and gas tight jacket.

The special fittings are so arranged that joints can be quickly made by expert wiremen, and they are designed so that the grounded sheath is continuous throughout the system. Because of the possibility of injuring the rubber insulation on the wire, the use of solder is considered inadvisable. It is, of course, necessary that the outer sheath be carefully grounded at the service switch so that the whole system will be thoroughly grounded. The concentric wiring system can be installed only with a special permit from the local insurance bureaus or municipal inspection bureaus. [General Electric Co., Schenectady, New York.]



METHOD OF INSTALLING AND SPECIAL FITTINGS.

A College Course in Caoutchouc.

THE growth and development of the city of Akron has been due almost entirely to the strides made by the rubber industry. The great demand made by the factories of the city for college men, and the evident superiority of young men with theoretical knowledge and practical experience with rubber, were the incentives which caused the introduction of a course in the chemistry of rubber by the Municipal University of Akron.

The chemistry of rubber is still in its infancy, due to the nature of the hydrocarbon to be dealt with, and also to the comparative youth of the industry. Owing to the rapid development of the manufacture of all kinds of rubber articles, the

MINIATURE WASHERS AND MIXERS.

ingenuity of chemists has been taxed to develop processes, and to find adequate methods of control, both of the raw material and the finished products. The varied nature of the raw materials used in the manufacture of rubber broadens the scope of a chemist employed in this work to such an extent that there is hardly a branch of his profession which is not touched at one time or another.

This course at Akron is an advanced one, and to be taken only by men who have already had training in chemistry. The requirements for entrance are one year of general inorganic chemistry, one year of qualitative analysis, one year of quantitative analysis, and one year of organic chemistry. Men with such preliminary training should be in a position to fully comprehend the theories and understand the methods used in the analysis and manufacture of rubber.

The curriculum consists of lectures, conferences and laboratory work. The results of experiments which have been made to advance the theoretical knowledge in connection with the chemistry of rubber, from the latex to the vulcanized product, have been collected from different sources and are given to the student in the lectures. Their value and application are discussed fully, and, as far as possible, the development of the individual theories traced and applied to other branches of chemistry. The conferences consist in recitation work on subjects for which the student has been required to prepare himself by consulting various books and journals.

In the study of raw rubber, the botanical origin, the nature of the latex, its method of collection and coagulation, are taken up in the lectures. The different grades of raw rubber on the market are studied with the aid of samples. These are used for lecture work, and also for practical chemical analysis in the laboratory, where the student carries out the methods as used in the technical laboratories. To get acquainted with the practical factory side of the manipulation of crude rubber, the student is given a sample to prepare for use in compounding. Besides going through the general analysis, he washes the rubber on the experimental washing mill and, after drying, calculates the loss due to washing and, from that, the cost of the rubber to the manufacturers.

Besides taking up the general nature of the pigments, fillers, diluents and the well-known accelerators, a study of their chemical properties and methods of manufacture is gone into. If they are obtained as by-products in some other industry, these industries are reviewed as far as the time allows. The general methods of analysis for factory control are discussed, and carried out in the laboratory with samples which will later be used in actual compounding. Emphasis is placed upon the great value of the relation between the specific gravity of a substance and its cost per pound.

The methods of analysis of vulcanized rubber as used today are fully discussed and carried out in the laboratory. Thus the student becomes acquainted with the various forms of apparatus used in the analysis, and also gets a working knowledge of such methods as give comparatively good results.

The theories on compounding and vulcanizing of rubber are taken up in lecture and conference work. In the laboratory the student carries out these processes from a practical factory point of view. The rubber laboratory is equipped with modern standard mixing mills, a vulcanizing press, a steam vulcanizer heated by a smaller boiler, which can be regulated to any practical vulcanizing temperature desired, and a tensile testing machine. As the cost of a compound, together with its specific gravity, is a most essential factor in rubber manufacture, the method of calculation from the cost and specific gravity of the raw materials is gone into and the importance discussed.

The student first makes up simple standard compounds, vulcanizes them, and, after getting the tensile strength, calculates

MINIATURE PRESS AND VULCANIZER.

the volume cost from the raw products used. A check is obtained by determining the specific gravity of the finished product. After he is familiar with the manipulation of the rubber compounding he is given problems in making up formulæ having given properties and given volume costs. By actual compounding and vulcanizing, the practicability of the formulæ is determined. In this way he becomes familiar with practical factory problems.

During the year, by courtesy of the Akron rubber manufacturers, the students inspect all of the larger factories in the city where the processes, which cannot be carried out in a small

laboratory, are explained. Many of the students also spend their summer vacations working in different departments of the various factories in the city.

It is not the aim of the Municipal University of Akron to graduate experts on the chemistry of rubber. The limit of time

TESTING MACHINE.

allowed for the course permits only the teaching of the fundamentals. But with this preparation the student should be able to develop into a valuable rubber man, whether he be of the laboratory, factory or sales force.

The success of the course is shown by the fact that calls for graduates are received from all parts of the United States, and that these graduates have been uniformly successful in holding the positions thus obtained.

The course is in the direct charge of Professor William F. Zimmerli.

SCHOOLS FOR TIRE REPAIRERS.

THE business of repairing automobile tires, as many a car owner knows, is not one to be entrusted to any chance mechanic who happens to own an obsolete vulcanizing apparatus. In order that those to whom this work is entrusted shall know their business more thoroughly, special schools of instruction have been instituted and courses prescribed which will fit these men to do such work in a proper and efficient manner.

The Goodyear Tire & Rubber Co., Akron, Ohio, has instituted such a school where they teach men, free of charge, the art of repairing tires under practically the same conditions that are apt to obtain in their own workshops. A complete practical course is furnished. Beginning with fundamentals, every step in scientific tire repairing is demonstrated by expert teachers, and actual practice is given in the latest approved methods, so that when these students have completed their course it is stated they will be qualified to undertake any kind of repair job, from a puncture to a re-tread.

A picture of this tire repair school is shown herewith. At the left in the picture a buffing wheel is in operation. Next is shown the instructor demonstrating the use of a vulcanizer to an attentive student. In the center of the picture is shown a student placing the tire on the rim and, further to the right, another measuring fabric for repairing the carcass; while in the rear are to be seen other operations in tire repairing.

A similar institution is that of the Haywood Tire & Equipment Co., Indianapolis, Indiana, manufacturer of tire repair apparatus. In this school a ten days' course is given, covering personal, practical instruction in the making of every kind of tire repair, the rational use of the machinery, tools, etc. For those desirous of securing this practical education, but who live at too great a distance from the school, a correspondence course has been provided. A recent class included people from nine different states, from Vermont on the north to North Carolina at the south, who came to Indianapolis to secure instruction in what has been for many of their predecessors a profitable, useful and steadily increasing business.

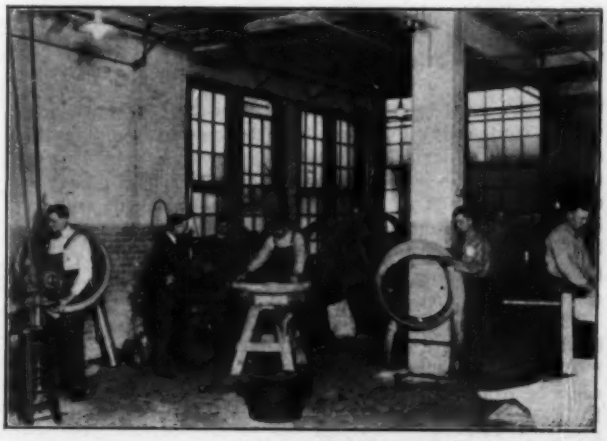
A more ambitious plan, perhaps, than either of the above, is that of the Akron Tire Repair School which was incorporated May 15 of this year, with a capitalization of $10,000. It occupies a building 29 by 125 feet, two floors and a basement. The second floor is used as a lecture room, the first floor for offices and equipment and teaching of actual repairs, and the basement for stock and storage.

The plan of this school is to obtain students through advertising who will come to Akron and for two weeks be instructed in the lecture room, where they will be shown by actual building the construction of the tire. This will be accompanied by general instruction regarding rubber, from its gathering and handling to the processes it goes through to reach the completed tire. Then will come instructions regarding the different troubles that come to a tire which will be shown by actual samples. The student is shown how to tear down and build up a tire for repair. After this course in the lecture room, the students will be taken into the shop where they will do actual work under trained teachers.

The repair shop is equipped with the Akron-Williams outfits made by the Williams Foundry & Machine Co., and will carry a complete line of these outfits for repairing tires. This shop will do the repair work on tires for a part of the 9,000 machines which are operated in and around Akron.

After the mechanical instruction has been completed, the business end will be taken up and instruction given in the merchandizing and financing ends of the business, the bookkeeping and routine of records, etc., being fully taught.

These schools are fitly situated in tire manufacturing centers. Their progress will be watched, and if they prove profitable to



A TIRE REPAIR CLASS AT THE GOODYEAR WORKS.

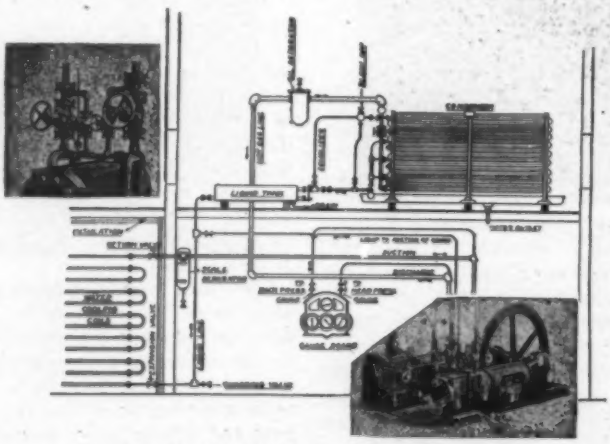
scholars and managers, it is more than likely that their example will be followed, and similar schools instituted in other sections, to provide for those who would find it inconvenient to travel so far in order to get the principles and rudiments of this comparatively new but very important industry.

Cooling Calender and Mill Rolls by Refrigeration.

THE question of keeping the rolls of calenders and mixers at the proper temperature is not a difficult matter during the greater part of the year. But in the summer during protracted periods of hot weather, river or pond water becomes too warm for cooling purposes.

Many years ago Frank A. Magowan, then at the heyday of his meteoric rubber career, installed a water tank for cooling calender rolls, and chilled the water with ice during the heated term. It was expensive and crude, but undoubtedly pointed the way to the present practice, that of installing small refrigerating plants for the same purpose. Several rubber factories have recently installed water cooling plants, which makes the following description of the De La Vergne plant most timely.

The refrigerating equipment required for this purpose is quite simple and is used to cool water which is circulated through pipes to the rolls of the mixers and calenders. The water cooling expansion coils consist of vertical pipe sections, each provided with a water distributing apparatus at the top. The water is pumped to this distributing apparatus from which it flows down over the outside of the vertical coils. Liquid ammonia is admitted at the bottom of these coils through expansion valves and expands upward, evaporating from the liquid state into gas. At the top it is drawn into the suction line back to an ammonia compressor. This compresses this gas to a pressure consistent with the temperature of the cooling water flowing over the ammonia condensers, in which the gas is turned to the liquid state. It then passes to the liquid ammonia tank and from there to the expansion valves to expand again from the liquid state to gas. In thus changing from liquid to gas, the ammonia absorbs heat from the water and the temperature is therefore reduced.



THE DE LA VERGNE REFRIGERATING APPARATUS.

The ammonia condenser usually consists of vertical coils similar to the water coolers mentioned. The cooling water flows on the coils at the top and down the outside, while the hot ammonia gas enters at the bottom and flows upward. Through several outlets in these coils, the liquid ammonia as it condenses is drawn off and passes to the liquid ammonia tank. It is desirable to obtain cooling water for the condensers at as low a temperature as possible, since the cooler the water, the lower the condensing pressure and a correspondingly less amount of power is required to drive the compressor.

The size of the refrigerating equipment required is determined by the amount of water to be cooled, the range through which it must be cooled and the final temperature. For instance, it might be required to cool 200 gallons of water per minute from 110 degrees to 50 degrees. The amount of refrigeration required would be determined as follows:

$$\frac{200 \times 8.33 \times 60}{200} = 500 \text{ tons.}$$

The range would be 60 degrees and since one ton of refrigeration per twenty-four hours equals 288,000 British thermal units, one ton of refrigeration per minute equals 200 British thermal units.

The final temperature of water being 50 degrees, the temperature of the ammonia would need to be a few degrees less than this, say 45 degrees. The suction ammonia pressure corresponding to 45 degrees would be about 65 pounds. Therefore, the ammonia compressor would operate between 65 pounds suction pressure and about 175 pounds condenser pressure, assuming that the water flowing over the ammonia condensers had an initial temperature of 75 degrees. Most refrigerating machines are rated on the basis of 15 pounds suction pressure, therefore to determine the proper size machine at this rating, we would figure: $\frac{500 \times 30}{80} = 190$ tons at 15 pounds suction pressure since the tonnage varies almost directly as the absolute suction pressure. This machine would have ample capacity.

By means of the refrigerating machine, the operator has absolute control over the water temperatures. At certain seasons of the year when atmospheric conditions are favorable for low temperatures, the refrigerating machine can be slowed down and the proper temperature of the ammonia maintained in order to give exactly the required temperature to the water to be cooled. In case of an unusual demand for the cold water, the refrigerating machine can be increased in speed and the ammonia expansion valve so adjusted as to give just the conditions required. The whole installation is very simple and can be operated very economically on account of the high suction pressure at which the compressor operates.

The same machine which is used for cooling the water for the rolls can be used also to cool drinking water for the employes. The usual arrangement consists in providing a tank in which there is an ammonia expansion coil for cooling the water. The cooled water is circulated through the various drinking faucets by a small pump. The amount of refrigeration required for this work is usually quite small.

TOTAL SULPHUR IN VULCANIZED RUBBER.

In the following method that has been proposed by A. Hutin, from 1 to 2 grams of finely divided sample is treated with 30 cc. of fuming nitric acid added in successive portions of 2 to 3 cc., and the mixture is evaporated to a syrup on the water bath. It is then treated with 2 to 3 cc. of pure sodium hydrate solution, drop by drop. The alkaline liquid is mixed with calcined magnesia to a thick paste, evaporated to dryness at 284 degrees F., and cautiously heated to avoid ignition.

The friable residue is heated and stirred with water on the water bath and the extract and washings (about 300 cc. for 1 gram of material) filtered, concentrated to 100 cc. and acidified with hydrochloric acid. The carbonic acid is expelled and the sulphuric acid precipitated with barium chloride. The final solution ought to be colorless, any coloration indicating that the ignition was incomplete.

Replete with information for rubber manufacturers.—Mr. Pearson's "Crude Rubber and Compounding Ingredients."

What the Rubber Chemists Are Doing.

VULCANIZATION OF CAOUTCHOUC BY MOLECULAR OXYGEN.

THE researches of I. I. Ostromyslenski have shown that the action of ozone in vulcanizing caoutchouc depends on the preliminary formation of the caoutchouc ozonide. The ready-formed ozonide has an effect similar to that of ozone, both soft and hard resins being formed. The course of the process is chiefly determined by the concentration of the vulcanizing compound. When caoutchouc is exposed in an atmosphere of dry air to the ultra-violet rays of a quartz mercury lamp, it undergoes gradual vulcanization, increasing in weight at the expense of the oxygen. At 104 to 176 degrees F. this process takes place with fair rapidity, but at 248 degrees F. no vulcanization occurs.

Vulcanization of caoutchouc by means of its ozonide takes place under the same conditions as vulcanization by benzoyl peroxide.

In the presence of moisture, chemically pure caoutchouc activates molecular oxygen and thus behaves like most of the terpenes. Thus, moist isoprene—or erythrene, caoutchouc of the normal series, when left in the air at ordinary temperature, gradually becomes covered with a layer of new, less elastic substance, this process being analogous to the drying of vegetable oils. If normal erythrene-caoutchouc, thus coated, is milled on cold rolls to render it homogeneous, and then heated in the ordinary way in the absence of air, the unchanged caoutchouc undergoes vulcanization. If, however, this surface is first removed, vulcanization does not take place. Evidently this layer, consisting of a product of the action of atmospheric oxygen on the caoutchouc, constitutes the vulcanizing substance.

The vulcanization of caoutchouc by its halogenides or ozonides is purely a physical process and is comparable with the formation of celluloid. The latter process may be regarded as vulcanization of cellulose esters by camphor, etc.

The large number of known vulcanizing agents indicates that the chemical nature of these plays no determining part. All these agents form colloids with the caoutchouc, and it is by these colloids that vulcanization is effected.

VULCANIZATION BY NITROBENZENES.

Dr. H. P. Stevens has endeavored, without success, to repeat the results of Ostromyslenski in the vulcanization of rubber by the use of nitrobenzenes (see The INDIA RUBBER WORLD, May, 1916).

His method was as follows:

A mixture was made, in the ordinary way, of 100 parts raw rubber and 2 parts of powdered dinitrobenzene. A control sample of rubber alone was prepared. Both samples were vulcanized, under cover, in steam for 3 hours at 275 degrees F. Comparison after this treatment showed no apparent difference between the samples, neither being vulcanized in the slightest degree. The rubber was simply lifeless and without nerve, same as when overmasticated and heated. The result seems to indicate, contrary to the announcement of Ostromyslenski, that dinitrobenzene has no vulcanizing property and is unable to replace sulphur in vulcanization.

ORGANIC PIGMENTS IN VULCANIZED RUBBER.

Most organic pigments are practically unavailable for coloring hot vulcanized rubber, because at high temperature, in the presence of sulphur, they readily decompose with loss of color. A method of special value in the manufacture of rubber articles, colored with such pigments, has been devised by I. I. Ostromyslenski, which permits vulcanization at the ordinary temperatures in the presence of sulphur, an amine, and an oxide. Certain organic pigments are not decomposed when heated either at a comparatively low temperature, or even at that of ordinary vulcanization, provided that the heat is maintained for only a short time. In such cases the process permits acceleration of the vulcanization or lowering the temperature employed. Experiments were made with eosin, erythrosin alkali blue and cinnamylidene-fluorene. In the case of erythrosin, a mixture of 3 parts of the dyestuff, 10 of caoutchouc, 2 of magnesium oxide, 0.8 of sulphur and 0.2 of piperidine-piperidyldithicarbamate, after cool mixing, was completely vulcanized in iron molds in ten minutes at 284 degrees F. Similar results were obtained with the other dyestuffs mentioned.

THE STRUCTURE OF CAOUTCHOUC.

Doctor Samuel S. Pickles in the "India Rubber Journal" (May 6, 1916) has briefly stated his views on the structure of caoutchouc, a summary of which is that the molecule consists of a large number of C_5H_8 complexes. Natural rubber contains at least eight of these units and the ring is a 32-carbon ring. The simplest form to express this formula is

$$(-CH_2-C(CH_3)=CH-CH_2-)n.$$

The chemical reasons why the ring, rather than the open chain form of molecule is preferred are (1) Caoutchouc combines with only two bromine atoms for every C_5H_8 complex which it contains (Weber); (2) Caoutchouc can be so oxidized that the whole of its carbon atoms appear as derivitives of levulinic-aldehyde and levulic acid (Harris). Assuming the correctness of these two observations, the closed ring follows as a corollary. The bulk of the evidence and the weight of opinion are at present strongly in favor of the large ring formula for caoutchouc.

ANALYTIC REACTIONS OF ISOPRENE.

THE presence of isoprene formed in a reaction of a diolefine with conjugated linkings is detected by I. I. Ostromyslenski by shaking 5 to 10 drops of the products of the reaction for a short time with 50 cc. of concentrated aqueous sulphur dioxide solution, the mixture being then left at the ordinary temperature in a hermetically sealed vessel. In the course of 2 to 30 hours an abundant, colorless, amorphous precipitate is formed. This consists of a compound of the diolefine with sulphur dioxide possessing characteristic properties.

Isoprene may be determined quantitatively by converting it into 1.3-dichloroisopentane. If a grams of the dichloroisopentane compound be obtained from S grams of the crude isoprene, the latter contains $3403\ a \times 70.49$ S per cent isoprene. The procedure is as follows: 200 grams of the crude isoprene, containing butylenes, amylenes, benzene, etc., with boiling point 86 to 104 degrees F., is energetically shaken with 1500 cc. of fuming hydrochloric acid for 6 hours in a mechanical shaker. The black, opaque upper layer of chloro-compounds is separated, washed with aqueous sodium chloride solution saturated in the cold, again separated after the emulsion formed has separated into two layers, dried over calcium chloride and distilled. At 104 to 122 degrees F. only two or three drops of hydrocarbons generally distil over, and the fraction 122 to 194 degrees F. contains butylene and amylene chlorides. The fraction 194 to 266 degrees F. is collected separately. From 266 degrees F. the temperature usually jumps immediately to 288 degrees F., the boiling point of the 1.3-dichloroisopentane. When the crude isoprene has been obtained, for example, from turpentine, the 1.3-dichloroisopentane cannot be distilled, but it is found that the residue distilling with boiling point beyond 291 degrees F. consists, in spite of its black color, of almost chemically pure 1.3-di-

chloroisopentane. This residue may be filtered through glass wool and the filtrate weighed. The fraction boiling at 194 to 266 F. is subjected to careful fractional distillation, as it contains 1.3-dichloroisopentane, sometimes in considerable quantity. The fractionation is carried out three times in each case up to 288 degrees F.

ANALYSIS OF LITHOPONE.

THE tentative methods of the American Society for Testing Materials for the analysis of lithopone are as follows:

INSOLUBLE MATTER. Take 1 gram of the sample in a 200 cc. beaker, add 10 cc. of concentrated hydrochloric acid and mix. Add in small portions about 1 gram of potassium chlorate; then heat on steam bath until about half of the liquid is evaporated. Dilute with water, add 5 cc. of dilute sulphuric acid (1 part of acid to 10 of water); boil, settle, filter, wash, ignite, cool and weigh the insoluble matter, which should be only barium sulphate.

TOTAL ZINC. The filtrate from the insoluble matter is made alkaline with caustic soda, acid with hydrochloric acid, add 3 cc. of concentrated hydrochloric acid, dilute to about 250 cc. with water, heat nearly to boiling, and titrate with potassium ferrocyanide solution and calculate to zinc.

ZINC OXIDE. Treat a 4 gram sample of lithopone for 4 hours with 200 cc. of 1 per cent acetic acid at ordinary temperature, stirring occasionally. Filter by suction on a double filter paper and wash with cold water; add to the clear filtrate 13 cc. of concentrated ammonia water, neutralize with hydrochloric acid, and then add 3 cc. of concentrated hydrochloric acid in excess; heat to boiling and titrate with potassium ferrocyanide, using uranium acetate solution as an outside indicator. Calculate to zinc oxide. Calculate this result to zinc, deduct from total zinc, and calculate difference to zinc sulphide. Zinc carbonate or zinc sulphate is included in the zinc oxide.

ZINC SULPHIDE. Place 0.5 gram of pigment in evolution flask with about 10 grams of mossy zinc, add 5 cc. of water; insert the stopper carrying a separatory funnel and an exit tube. Run in 50 cc. of concentrated hydrochloric acid from the funnel, having previously connected the exit tube to two absorption flasks in series; first flask contains 100 cc. of alkaline lead nitrate solution, second flask 50 cc. of same as a safety device. After all of the acid has run into the evolution flask heat slowly, finally boiling until the first appearance of steam in the first absorption flask; disconnect, let the lead sulphide settle, filter, wash with cold water, then with hot water till neutral to litmus paper and washings give no test for lead. The lead sulphide precipitate is dissolved in hot, dilute nitric acid, evaporated to fumes with sulphuric acid, and finally weighed as lead sulphate. Calculate to zinc sulphide.

The alkaline lead solution is made as follows: Into 100 cc. of potassium hydrate solution (56 grams in 140 cc. of water) pour a saturated solution of lead nitrate (250 grams in 500 cc. of water) until the precipitate ceases to redissolve, stirring constantly while mixing. About 3 volumes of the lead solution will be required for one of the alkali.

Instead of absorbing the evolved sulphuretted hydrogen in alkaline lead nitrate solution, a solution of 8 grams of cadmium chloride in 250 cc. of water and 150 cc. of ammonia water (sp. gr. 0.90) may be used. The cadmium sulphide precipitated, may be filtered on a weighed Gooch, washed with water containing a little ammonia, dried at 212 degrees F., and weighed. Calculate to zinc sulphide. It is better to filter the cadmium sulphide on a small filter and wash as above, then place filter and precipitate in a beaker and dissolve in hydrochloric acid and potassium chlorate (keeping at room temperature at first); filter out any paper pulp or insoluble matter; make filtrate alkaline with ammonia water, then just acid with hydrochloric acid, heat to boiling, and precipitate with barium chloride in the usual manner. Filter, wash, ignite and weigh as barium sulphate. Calculate to zinc sulphide.

For very rapid work the contents of the absorption flask, after all sulphuretted hydrogen has been absorbed, may be washed into a vessel with cold water, and diluted to about one liter, acidified with concentrated hydrochloric acid, and titrated with standard iodine solution, using starch indicator. (The precipitate should be completely dissolved.) The iodine solution is prepared by dissolving about 12.7 grams of pure resublimed iodine and 18 grams of potassium iodide in a little water, and then diluting to one liter.

TESTS ON LITHOPONE.*

COLOR. The color of the dry pigment should be compared with a standard sample of pure dry zinc oxide and a standard sample of lithopone that has been kept in a colored glass jar protected from light. Portions of these samples should then be ground in light colored linseed oil and again compared for whiteness.

OPACITY. The relative opacity or "dense" character of the samples may be determined by making small batches of paste paint with mortar and pestle. To 25 grams of lithopone add 2 grams of 98 per cent red oxide of iron. Use about 10 grams of raw linseed oil (pale) for grinding. Brush out a sample of the paint upon a strip of glass in comparison with others prepared in the same manner. The most "dense" grade of lithopone will give the lightest effect.

TESTING RUBBER INSULATION.

In testing rubber insulation according to the Underwriters' Specifications, Aaron Arthur Ladon, Chicago, Illinois, has found that samples taken from the same coil showed marked variation in strength and elongation. The wire had been in stock some time and the tests were carried out with the idea of putting it in with the new stock, provided the insulation had not deteriorated.

Samples 5 inches long were taken from each coil. They were rolled between two blocks of wood to loosen the insulation. The rubber could then be slipped off the wire. The insulating material was then tested for elongation, stretch and tensile strength.

The results varied as much as 100 per cent, and in only six coils out of 52 did the samples check.

The trouble did not lie in non-uniformity or deterioration of the rubber compound, as was first supposed. The method of separating the wire from the insulation was at fault. No matter how carefully the samples were rolled between the two blocks, the insulation could not be removed intact. In places it would stick to the wire.

A new method was therefore devised for removing the insulation. The wire was tinned copper. Tin amalgamates with mercury very easily and forms a very slippery surface on the copper. The mercury has no effect on the rubber compound. About ¼ inch of insulation was cut off of each end of the samples and the stripped wire scraped to remove dirt and grease. The ends of the samples were then immersed in mercury. After a period of time, varying from 4 to 24 hours, the insulation could be slipped off the wire with almost no effort.

This method is being used by one of the largest electrical manufacturers in the country. Besides the accuracy and uniformity of results accompanying the application of this property of mercury, the cost of the testing has been reduced by over one-third.

A NEW SOURCE OF ANTIMONY.

Alaska, during 1915, shipped to San Francisco about 800 tons of antimony, chiefly from the region about Fairbanks. Four deposits are being worked on a small scale. The mineral is found in pockets and contains 50 to 58 per cent of metallic antimony. This discovery is not remarkable, since antimony is frequently found in abundance in gold bearing strata.

*A circular issued by Henry A. Gardner, Director, Scientific Section, Educational Bureau, Paint Manufacturers' Association.

CHEMICAL TREATMENT OF RUBBER.

UNITED STATES PATENT.

ADHERING RUBBER TO FABRIC. The process of uniting fabric or fibrous material and a rubber compound containing a vulcanizing medium consists in treating the fabric with a non-vulcanizing medium, non-detachably associated with the fabric and which has greater adhesion for rubber than the fabric, and finally vulcanizing the rubber to the fabric. [United States patent No. 1,184,015. Raymond B. Price, assignor to Rubber Regenerating Co., Mishawaka, Indiana.]

SYNTHETIC CAOUTCHOUC. By this process there is heated in a closed vessel, with an acid reagent, a distillate, obtainable by cracking pinene into various hydrocarbons by passing it, in the form of vapor, through a tube heated to a temperature of between 572 degrees and 662 degrees F., and then cooling quickly, and distilling the hydrocarbons. The resultant mixture is heated in a closed vessel, thereby creating pressure and maintaining the temperature constant while the pressure drops, and until the pressure reaches a point where it remains substantially constant, distilling off the volatile matter, and oxidizing the residue. [Eva Gottschalk, Newark, New Jersey. United States patent No. 1,185,654.]

THE UNITED KINGDOM.

SUBSTITUTE FOR CELLULOID OR LEATHER. India rubber is converted into a chlorine derivative by dissolving it in carbon tetrachloride or other solvent, which does not react with chlorine, but is a solvent of the product to be obtained, hydrocarbons being excluded; and treating with chlorine, or a gaseous mixture containing chlorine. A filling agent, such as camphor, may be incorporated with the material. The solvent is removed by evaporation or distillation, or the new derivative may be precipitated by alcohol or other miscible solvent which has no solvent action on the substance. [S. J. Peachey, Stockport, England. British patent No. 1,894 (1915).]

OTHER CHEMICAL PATENTS.

UNITED STATES.

1,187,229. Process of making condensation products of phenols and formaldehyde. L. H. Baekeland, Yonkers, N. Y., assignor to General Bakelite Co., New York City.

1,187,230. Reaction product of hexamethylenetetramin and phenolic bodies and method of making same. L. H. Baekeland, Yonkers, N. Y., assignor to General Bakelite Co., New York City.

1,187,231. Phenolic condensation product and method of making the same. L. H. Baekeland, Yonkers, N. Y., and N. Thurlow, New York City, assignors to General Bakelite Co., New York City.

1,187,232. Process for making insoluble bodies derived from phenol alcohols. L. H. Baekeland, Yonkers, N. Y., assignor to General Bakelite Co., New York City.

DOMINION OF CANADA.

*167,969. Rubber substitute. The B. F. Goodrich Co., New York City, assignee of The Diamond Rubber Co., assignee of D. Spence and A. P. Clark—all of Akron, Ohio.

HOLLAND.

*1,187. Coagulating latex and drying the resultant caoutchouc. Henderson & Korn, New York City.

1,239. Rubberizing textile materials. Lucien Liais.

*Denotes Patents for American Inventions.

ALBINITE.

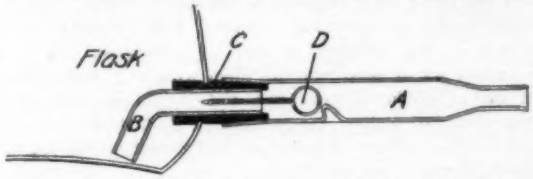
A new compounding ingredient known as Albinite white is being introduced in the French rubber industry. It is described as kaolinite, obtained chemically as a double decomposition product of extreme purity, whiteness, and of impalpable fineness. It is said to act as a vulcanization accelerator and is an inexpensive and satisfactory substitute for zinc oxide.

Replete with information for rubber manufacturers.—Mr. Pearson's "Crude Rubber and Compounding Ingredients."

LABORATORY APPARATUS.

A CHECK VALVE FOR SUCTION FLASKS.

AN effective ball valve easily made and attached to the usual types of suction flasks has been devised by G. P. Walton, of the Bureau of Chemistry, U. S. Department of Agriculture. It consists of a glass tube *A* having an indentation or other check for the ball valve; a glass ball valve with guide *D* blown from a capillary tube; an inner glass tube *B*, and the valve seat *C*, a short piece of smooth, heavy rubber tubing with square cut ends. The parts are shown assembled and fitted to the usual form of suction flask. A rubber drain tube, not shown,



completes the apparatus. A comparatively slight suction is sufficient to close the valve perfectly, and upon releasing the suction a column of liquid in the flask a fraction of an inch above the valve is sufficient to start the outflow.

In the form of suction-flask not provided with an outlet at the bottom, a suitable vent may be drilled, by using a short section of copper tube in a drill press with carborundum and water for abrasive. To adjust the valve, force the rubber *C* through the vent, moisten the inner tube *B*, and push it through the rubber, making a tight joint between the latter and the wall of the flask; place the ball *D* in position, and force the outer tube *A* over the rubber. The rubber should project about 1/16 inch beyond the end of the inner glass tube, which serves merely as a siphon and brace for the valve-seat.

SPECIAL BINOCULAR MICROSCOPE.

A binocular microscope is particularly applicable to the work of an industrial laboratory, both for inspection and research. Through its double optical system the object is viewed with both eyes so that it is seen in relief, as with the unaided vision, and a distinct stereoscopic effect obtained. The image is also shown in its true form, and not transposed or inverted as with the regular microscope.

The binocular microscope is thus of special advantage in examining surfaces and materials of all sorts, as wood, metal, leather, rubber, fabrics, etc., and for noting the results of tool work on surfaces. A real perception of depth is obtained when viewing furrows, cracks, or like depressions.

The model illustrated has an extremely wide range of adjustments, permitting it to be conveniently used for every kind of work to which it may be put. For the examination of transparent or translucent materials, for counting threads in cloth or the like, the specimen is placed upon the stage and light directed through it by the mirror. When examining large surfaces, such as pieces of leather, rubber or paper, which are too large to be placed upon the stage, the upper part of the instrument may be detached and used with the stage as a base. This is the arrangement shown in the illustration.

The magnification obtainable with the outfits supplied with this instrument varies from 10 to 74 diameters. [Bausch & Lomb Optical Co., Rochester, New York.]

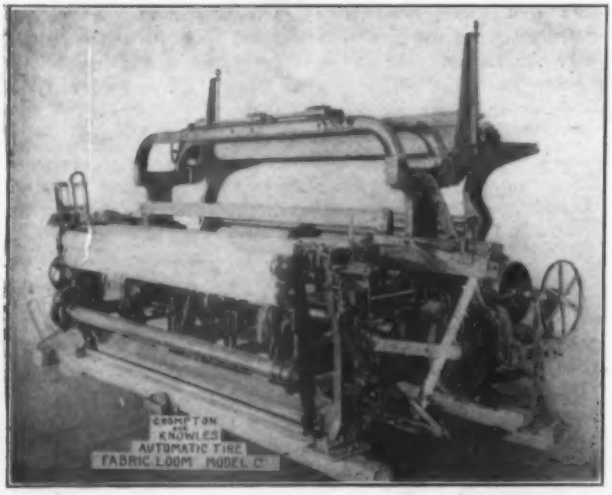
New Machines and Appliances.

AUTOMATIC TIRE FABRIC LOOM.

THE prominence that pneumatic tires have given to certain fabrics has resulted in many improvements in the looms on which building fabric is woven. The question of increased production has been fully considered in the design and construction of the loom shown in the illustration, which embodies the latest improvements in machines of this type.

These looms are generally equipped with automatic shuttle changers so that changing by hand is eliminated. The magazine carries six or seven shuttles filled with weft, and when the yarn on a bobbin is exhausted the shuttle is automatically thrown out and a new one substituted so that the loom continues to run without stopping as is necessary with the older types of looms.

There are various claims as to the percentage of production, but, broadly speaking, the average on each loom is from 80 to 90 per cent of a theoretical production of 100 per cent; moreover, the automatic loom is said to give better production and the cloth is woven more perfectly. This loom, therefore, is a decided improvement over the older type, where the filling or weft is changed by hand. Ordinarily, with the automatic loom, the amount of waste is less, referring particularly to the amount



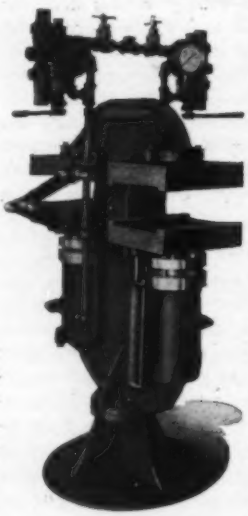
of yarn left on the bobbins, because the automatic feeder can be set so that a very small amount is left. As the yarn used in tire fabrics is very expensive, the question of waste is a very essential matter to guard against.

The looms are made in various widths from 48 to 90 inches. As there has been some demand for long lengths of fabric during the past year, the looms are equipped with an attachment so that a roll of cloth 125, 250 and even 500 yards can be rolled up in the loom as woven. Most of the tire fabric is made from combed Sea Island or Egyptian yarn of the very best quality and weighs 17¼ to 17½ ounces per square yard. The number of picks per inch is usually 23¼ to 23½, and the fabric must be woven very carefully and free from knots.

The looms are particularly heavy and in a way similar to the duck loom, the widest weighing approximately three tons. The speed is usually from 128 to 100 picks a minute, according to the width; the wider the loom the slower the speed. They are driven by belt or by motor, and a great many of the newer mills are equipping with individual motor drive, which is a desirable advantage. [Crompton & Knowles Loom Works, Worcester, Massachusetts.]

A NEW 15-TON DUPLEX VULCANIZING PRESS.

Increased production and economy in floor space are the special advantages claimed for the Duplex vulcanizing press shown in the accompanying illustration.



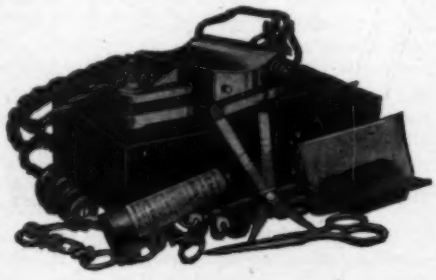
It is specially designed for tire manufacturers, to be used in patching slight defects in non-skid casing treads; however, it is readily adaptable to the manufacture of a variety of small mechanical rubber goods.

This press is built for 1,500 pounds accumulator pressure and develops 15 tons on each side. The rams are 5 inches in diameter with a 4½-inch stroke, and spring returns or "pull backs." The platens are 12 by 14 inches, with 4½-inch mold space and are connected by swing joints and chambered for steam. Plain flat platens can be furnished if desired. Each side of the press is operated independently and controlled by patented single pressure quick operating valves.

The weight of the machine is 1,450 pounds and it occupies a floor space of 36 by 34 inches. Height over all is 6 feet 7 inches and height of the platen from the floor is 3 feet. [Metalwood Manufacturing Co., Detroit, Michigan.]

PREMIER ELECTRIC VULCANIZER.

Tire repairing on the road, or, for that matter, in the garage, is exceedingly simple, safe and sure, according to the claims made for the Premier electric car repair vulcanizer. This handy little device can be used in making repairs on casings and inner tubes with ease and facility. Attach the wires to the storage batteries or a 110-volt lighting circuit and after preparing the tube or casing, clamp on the device and press the red button shown in the illustration on the side of the vulcanizer. When the vulcanizer develops sufficient heat to cure the repair, an automatic temperature control instantly shuts off the current.



The apparatus weighs but two pounds, and the standard equipment includes a tool for holding open the cut when preparing a casing, scissors for cutting the Para rubber gum, a tube of quick curing cement, a piece of emery cloth for cleaning and roughening the rubber, and wax papers to place over the repair to prevent the vulcanizer from sticking. The vulcanizer is fitted with a connecting cord and a durable chain for clamping to the work, the whole outfit being packed in a neat container. [Premier Electric Co., Chicago, Illinois.]

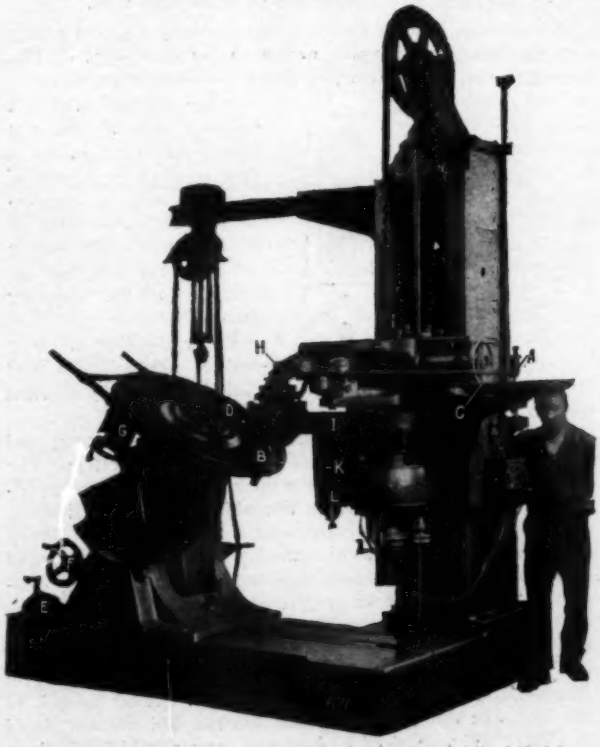
MACHINE FOR ENGRAVING NON-SKID TIRE MOLDS.

The universal engraving machine illustrated and briefly described here, was designed for the purpose of engraving non-skid molds used in the manufacture of pneumatic tires of all descriptions.

It works on the familiar pantograph principle, where a tracing pin at one end of the pantograph is guided over a carefully

prepared copy of the design which it is desired to reproduce, and the engraving tool at the opposite end of the pantograph accurately cuts this design in the tire mold.

A is the tracing pin and *B* the engraving tool. The copy to



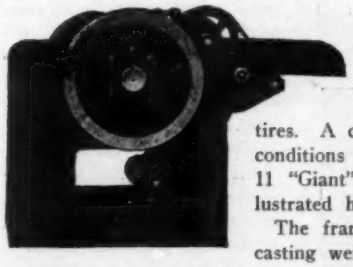
be followed is fastened to the holder plate *C*, while the mold to be engraved is clamped to the index plate *D*, which can be adjusted to any angle by the hand wheel *F*. The handle *E* provides for adjusting the position of the work holder. The drum *G* is provided for moving the work through fractional parts of a revolution. The "copy" guides the engraving tool in a horizontal plane, but owing to the fact that the mold is concave, a template *H* is provided to control the vertical movement of the engraving tool.

The vertical cutter spindle is mounted in the frame *I*, to which the motor spindle drive is also attached. The motor and spindle mechanism are supported on the link *K*, which in turn is carried by the pivot *L*, and a similar pivot on the column slide. These pantograph pivots are fitted with radial and thrust ball bearings, so that the movement is very sensitive.

All types of molds, for all sizes of tires up to 48 inches in diameter, can be engraved on this machine. Concerning the rate of production, a letter *S*, 1½ inches high, was engraved in a forged steel ring to a depth of 5/16 inches in four minutes. The same letter was engraved in cast iron in 1½ minutes. The dimensions of the machine are as follows: Height 12 feet, floor space 5 by 9 feet, net weight 18,000 pounds. [George Gorton Machine Co., Racine, Wisconsin.]

THE "GIANT" RUBBER SCRAP CUTTER.

The increased use of motor trucks within the last few years has naturally thrown a great many old tires on the rubber scrap market, which has brought up new problems as to the best way of getting them into shape for reclaiming. A very heavy, strong machine is of necessity required for cutting these large solid tires. A cutter built to meet these conditions is the Taylor-Stiles No. 11 "Giant" rubber scrap cutter, illustrated here.



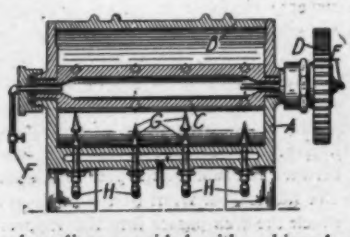
The frame is made of one solid casting weighing over 2,800 pounds. The head, or revolving knife cylinder, is steel, 20 inches in diameter, weighing about 1,100 pounds, and is practically unbreakable. The main shaft is 6-inch hammered steel, with bearings 11 3/16 by 5⅜ inches. It is equipped with two 24 by 8⅛-inch special balance shearing pulleys, one on each side, which gives a nearly perfect balance and enables the cutter to be driven either right or left hand. The shearing feature of these pulleys prevents the possibility of any serious damage due to running iron or any foreign matter into the machine.

After the tire has been cut once, it is fed endways into the feed box and passing under the spiked feed roll, it is cut off into slices from ¼-inch to ½-inch thick by the three 17-inch revolving knives cutting against the bed knife, leaving the material in good shape for further treatment. This machine will handle equally well pneumatic tires, hose or any other rubber scrap. [Taylor, Stiles & Co., Riegelsville, New Jersey.]

MACHINERY PATENTS.

PRICE'S VACUUM MASTICATOR.

WHEN rubber stock is prepared previous to vulcanization it is very important that the material should be free from entrapped gases or liquids. This object is accomplished by the novel application of a vacuum in connection with a machine commonly known as a masticator.



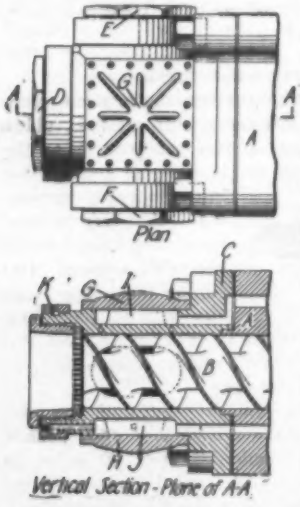
In the illustration, which shows a side elevation in section, *A* is the cylindrical casing jacketed for heating and cooling, provided with a hinged cover *B*. The corrugated

roll *C* is hollow and connected to pipes *E* and *F* through which the heating or cooling medium is conducted. It revolves in bearings supported in the ends of the casing and is driven by a spur gear *D*. A multiplicity of hollow pins *G* extend within the casing and are connected to the vacuum pipes *H*.

As the roll rotates, the rubber stock will be kneaded between the corrugated roll and the inner sides of the casing; meanwhile the hollow pins will penetrate the mass and the gases and fluids withdrawn from the material by action of the vacuum. [Raymond B. Price, New York City, assignor to Rubber Regenerating Co., a corporation of Indiana. United States patent No. 1,184,016.]

ROYLE'S TUBING MACHINE HEAD.

Tubing machines are at times subjected to excessive strain due to overcrowding the capacity for which the machine is designed. Royle's invention precludes this danger, whether the machine is used for multiple tube forming or straining reclaimed rubber, by providing a plurality of discharge openings in the head.

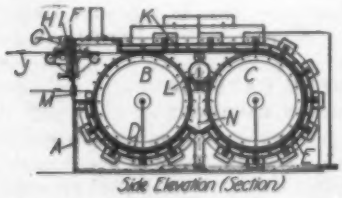


Referring to the drawings, *A* represents the tubing machine cylinder, and *B* the stock worm. *C* is the strainer head and *D*, *E*, and *F* the hollow nuts that screw into the discharge openings and hold in place the strainer plate, or die and core bridge, as the case may be. The opposite sides of the head between the discharge openings are covered by plates *G* and *H*, forming chambers *I* and *J*, in which circulates either a heating or cooling medium. The annular chamber *K* surrounds the front discharge opening for the same purpose.

The construction of the head permits the stock worm to be used at full capacity without danger of overcrowding, since the material will find an outlet through the lateral passages when the forward discharge passage is overloaded. [Vernon Royle, Paterson, New Jersey. United States patent No. 1,182,711.]

HOPEWELL'S ENCLOSED SPREADER.

This machine proofs and dries the fabric within an enclosed chamber from which the volatile vapors are conveyed to a separate apparatus where the solvent is recovered. The plates designated by *A* in the illustration enclose the revolving steam-heated cylinders *B* and *C*. Supplemental heat is furnished by the sectional steam plates *D*, *E* and *K*.



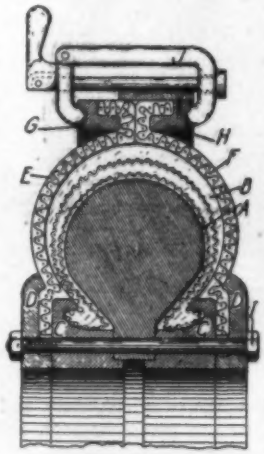
The spreading mechanism is bolted to the frame at *F* and comprises a transverse chamber in which a scraper travels back and forth automatically, cleaning the back of the hinged spreading knife *G* that is raised by hand levers *H*. The chamber *I* is provided with a fabric slot opening into the dryer and extending the entire width of the machine.

A metal fabric supporting strip closes the bottom of this chamber and passes around a transverse roller that is raised or lowered to adjust the distance between the fabric and spreading knife.

The dough is spread on the fabric *J* in front of the knife and seals the opening through which the web passes into the vaporizing chamber. Revolving knives remove foreign particles and imperfections and the coated and cleaned fabric passes around heated drum *C*, over water-cooled roller *L* and around drum *B*, passing out through opening *M*, sealed by felt-covered rollers. The volatile vapors are conveyed to a brine-cooled solvent condenser of the usual coil type where the solvent is recovered. [Charles F. Hopewell, Newton, Massachusetts. United States patent No. 1,184,452.]

A NEW OPEN CURE TIRE MOLD.

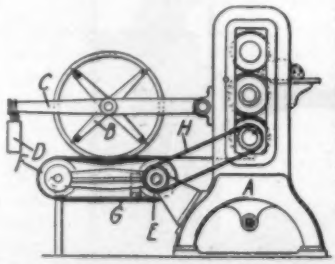
The principal object of this invention is to avoid the wrapping process customary in open cure tire vulcanizing. In place of the usual strips of cotton cloth that are wound around the mold and tire, a fabric diaphragm is clamped securely on both sides of the tire, forming a flexible support, covering the casing and tread.



In the cross-section illustrated, *A* is the tire core, *B* the tire casing and *C*, *C* the two bead rings. *D*, *D* are the two rings that hold in place the lower edges of the flexible diaphragms *E* and *F*, composed of canvas or rubberized cloth, while the upper edges are held by two rings, *G* and *H*. Bolts *I* clamp the inner parts together, and clamps *J* hold the outer sections in place. The mold is then placed in the heater and the tire cured by the open cure process. [William A. Robbins, Glen Ridge, New Jersey. United States patent No. 1,184,774.]

APPLYING HARD COMPOUND TO SOLID TIRE RIMS.

This machine receives the hard rubber compound from a strip forming calender and lays it evenly on the metal base or rim, forcing it into the grooves provided for anchoring purposes.



In the illustration, *A* is a calender and *B* the rim chuck that revolves on a stud attached to an arm *C* provided with a counterweight *D*. This arm is pivoted to a shaft that is journaled in bearings attached to the calender frames.

Below the rim, drums *E* and *F* are mounted and carry a wire belt or a series of wire belts *G*, driven by sprocket gearing and chain *H* from the calender.

The rim is then placed upon the machine feeding the compound to be used for the base of the tire and put in operation. The strip of compound passes between the rolls and upon the traveling belt which rolls it upon the rim while still warm and tacky, causing the latter to revolve through frictional contact. When the rubber on the rim is of sufficient thickness, it is removed and placed upon the second machine, which applies the compound for forming the outer part of the tire. In making tires according to this invention, a number of calendering machines are provided, having attached thereto the apparatus described, one complete machine being provided for each of the different compounds to be incorporated in the tire. After enough of this has been rolled upon the rim, the rim and tire are placed in a mold and vulcanized by heat and pressure. [John J. Gammeter and Walter H. Allen, Akron, Ohio, assignors to The B. F. Goodrich Co., New York City. United States patent No. 1,183,552.]

A CORD TIRE. Endless loops of rubber-impregnated strands are twisted, forming cords with loops at each end which are laid over the core and held by the bead wires which pass through the loops of the cords. [George F. Fisher, Plainfield, New Jersey, assignor to Morgan & Wright, Detroit, Michigan; United States patent No. 1,183,965.]

BEAD WIRE FORMING MACHINE. A number of wire strands can be wound on a form wheel by setting a stop bracket at a point indicated on the scale. When the indicated number of revolutions has been wound on the form wheel the machine stops automatically. [F. C. Brucker, Akron, Ohio, assignor to Miller Rubber Co., Akron, Ohio; United States patent No. 1,184,619.]

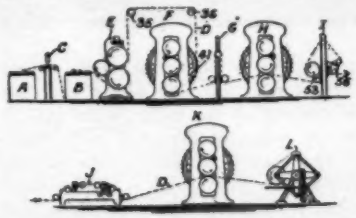
CALIPER GAGES FOR RUBBERIZED FABRICS. Two ordinary gages are mounted above a tension roller over which the rubberized fabric passes, the thickness being continuously indicated by the gages. [Thomas Midgley, Worthington, Ohio, assignor to Morgan & Wright, Detroit, Michigan; United States patent No. 1,184,002.]

TIRE BUILDING MACHINE. A plurality of stock rolls for frictioned fabric of different widths are mounted on a reel. The fabric is fed to the core by feed rollers that stretch the fabric. The feed rollers are driven by a friction wheel that contacts with the core and regulates the stretch of the different fabric plies as they are applied to the core. [William W. McMahan, assignor to Morgan & Wright, both of Detroit, Michigan; United States patent No. 1,183,996.]

British Patents.

SEIBERLING'S FRICTION CALENDERS.

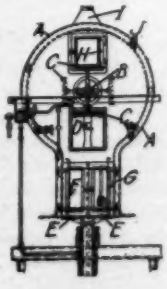
This patent relates to continuously-working apparatus for coating both sides of the fabric with rubber and for applying a skim coating to one of the sides. The fabric to be coated is placed in two stacks *A*, *B*, with a railway sewing-machine *C* interposed for joining the end of *B* to the beginning of *A*. The fabric *D* is drawn from the top of *B* and passes through a tensioning device *E* over idler rolls 35, 36, 41 to a calender *F*, where the under side receives a coating of rubber. The fabric then passes through a tensioning device *G* to a second calender *H*, which coats the upper surface, and thence to a tensioning device *I* having cooling rollers 53, 56. The fabric next passes to a device *J* wherein the selvage edges are trimmed off and a third calender *K* applies a skim coating to the upper surface of the fabric, which finally is wound up by a device *L*. [F. A. Seiberling, Akron, Ohio. British patent No. 1,289 (1915).]



A NEW DIPPING MACHINE.

The cylindrical casing *A* is shown in end elevation and contains a central shaft *B* having radial arms supporting at their outer ends four carriers *C* for the dipping forms *D*. The lower part of the casing forms a chamber *E* located over a hydraulic ram, upon which is wheeled a solution tank *F* through the doors *G*. The forms are introduced through a door *H*.

The shaft being locked, with one set of forms arranged vertically over the tank, pressure is applied to the ram and the tank is raised until the forms are immersed in the solution, then a trip lever shuts off the pressure and opens the exhaust which lowers the tank.



When this is clear of the forms, the shaft is unlocked and turned by means of the hand wheel to bring down the next set of forms, and the operation is repeated. The tank has hinged lids that open and close as it is raised or lowered. The vapors escape through the pipe *I* and a steam coil *J* is provided for drying the dipped forms. [J. W. Reeves, 25 Great Poultney street, London, England. British patent No. 1,344 (1915).]

DRIVING BELT FOR MOTOR CYCLES. Two ridges extend continuously around the outer surface of the belt. In another type transverse ridges forming troughs are used, the idea in both instances being to carry off any water that would cause the belt to slip. [Dunlop Rubber Co., Limited, London; British patent No. 4,692 (1915).]

GAS HEATED VULCANIZING PRESS. The platens are heated by gas burners in combination with means for automatically maintaining the platens at a predetermined temperature. [I. Hall, Whitehouse street, Aston, Birmingham, England; British patent No. 1,063 (1915).]

OTHER MACHINERY PATENTS.

THE UNITED STATES.

1,183,121. Core for resilient wheel tires. F. V. Roesel and C. H. Franks, Akron, Ohio.
1,183,907. Apparatus for making cores for resilient wheel tires. F. V. Roesel and C. H. Franks, Akron, Ohio.
1,184,034. Testing machine. H. L. Scott, Providence, R. I.
1,184,949. Heater for dental vulcanizers. U. A. Twynn, St. Louis, Mo.
1,184,988. Tire mold. H. S. Patton, Alameda, Calif.
1,184,990. Means for effecting the union of layers having adhesive surfaces. J. E. Perrault, Belmont, assignor to Hood Rubber Co., Watertown—both in Massachusetts.
1,186,374. Plaiting machine. F. F. Brucker, assignor to Miller Rubber Co.—both of Akron, Ohio.
1,186,591. Machine for the mechanical production of the covers for pneumatic tires. A. Mathern, Zollikon, near Zurich, Switzerland.
1,187,339. Tire bead forming apparatus. C. Kuentzel, assignor to The Republic Rubber Co.—both of Youngstown, Ohio.
1,187,436. Portable repair vulcanizer. A. B. Low, Denver, Colo.

THE DOMINION OF CANADA.

168,025. Tread ring for vehicle tire molds. F. McRae Bawden, Toronto, Ontario, Canada.

THE UNITED KINGDOM.

978 (1915). Vulcanizing india rubber. J. H. Nuttall and D. Bridge & Co., Castleton Iron Works, Castleton, Lancashire.
1,058 (1915). Molding plastic materials. A. Bartels, 102 Buxtehuderstrasse, Harburd on the Elbe, Germany.
1,143 (1915). Pulley provided with a surface wrapping consisting of layers of rubber coated cloth. Baroness A. Budé, Rue de l'Arrivée, Enghien, near Paris.
*100,209 (1916). Tire building machine. Goodyear Tire and Rubber Co., 1144 East Market street, Akron, Ohio.
*100,397 (1916). Manufacture of pneumatic tires. A. H. Harris, Youngstown, Ohio.

*Denotes Patents for American Inventions.

PROCESS PATENTS.

MAKING SOLID TIRES. A process for making solid tires having bases of harder vulcanizing compound than the tread, consists in forming strips of compound of uniform thickness and applying them to the rim. [John R. Gammeter and Walter H. Allen, Akron, Ohio, assignors to The B. F. Goodrich Co., New York City; United States patent No. 1,183,551.]

METHOD OF MAKING TIRE CASINGS. The middle portion of the fabric is stretched to a greater degree than the edges and then shaped by cupping and applied while curved to the core. [John R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City; United States patent No. 1,183,553.]

REMOVING FLUIDS FROM RECLAIMED RUBBER. The rubber stock is penetrated by a multiplicity of hollow points through which gases or liquids are extracted and the mass subjected to pressure. [Raymond B. Price, New York City, assignor to Rubber Regenerating Co., Mishawaka, Indiana; United States patent No. 1,184,259.]

INSULATING TELEPHONE CABLES. In a telephone cable with

artificially increased induction load and wherein the conductor is insulated with gutta percha or similar material, the dielectric losses are minimized by eliminating or reducing the resinous substances. "Green" gutta percha which contains a small amount of resin may be used alone or may be mixed with gutta percha or balata to reduce the proportion of resin. Artificial gutta percha or *Gutta Gentzsch*, prepared according to Specification 15,255 (1899), may also be mixed with gutta percha or used alone. The insulating material may be arranged in several layers, and one or more of the substances, such as resin-freed balata, green gutta percha, *Gutta Gentzsch*, and gutta percha mixtures, may be used in some or all of the layers.

[K. W. Wagner, 1 Luisenenstrasse, Lankwitz, Berlin, Germany. British patent No. 1,346 (1915).]

OTHER PROCESS PATENTS.

THE UNITED STATES.

1,183,022. Method of making vulcanized rubber. C. D. Mason, Naugatuck, Conn., assignor to The Goodyear's Metallic Rubber Shoe Co., a corporation of Connecticut.

1,183,023. Vulcanized rubber article. C. D. Mason, Naugatuck, Conn., assignor to The Goodyear's Metallic Rubber Shoe Co., a corporation of Connecticut.

1,183,551. Process of making tires. J. R. Gammeter and W. H. Allen, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.

1,183,553. Method of making tires. J. R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.

1,184,259. Process for treating plastic material. R. B. Price, New York City assignor to Rubber Regenerating Co., Mishawaka, Ind.

1,184,035. Process of testing textiles. H. L. Scott, Providence, R. I.

1,184,328. Method of making cord tires. M. A. Dees, assignor to American Tire Co.—both of St. Louis, Mo.

1,185,654. Method of producing synthetic caoutchouc. E. Gottschalk, Newark, N. J., M. G. Titus and S. R. Monroe, executors of said E. Gottschalk, deceased.

THE UNITED KINGDOM.

692 (1915). Method of manufacturing rubber balls. A. Schnek, 32 Rafaelgasse, Vienna.

THE DOMINION OF CANADA.

*168,121. Method of manufacturing tires. Morgan & Wright, assignee of E. E. A. G. Meyer and G. W. Seiberling—all of Detroit, Mich.

*168,275. Process of eliminating porosity from a rubber bottom for a rubber shoe. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, assignee of W. E. Piper, Melrose, Mass.

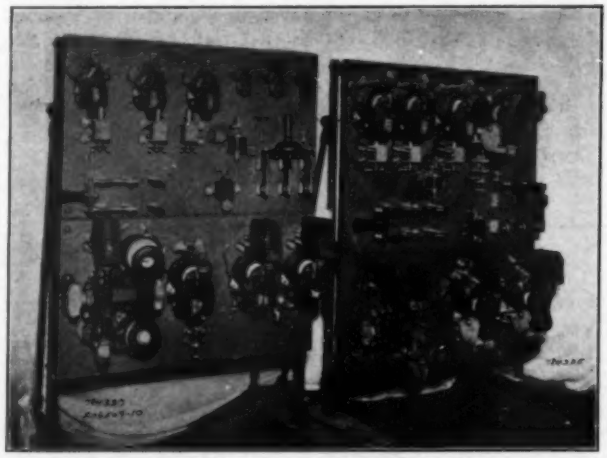
RUBBER CALENDER CONTROLLERS.

THE application of electrical apparatus to rubber calender drives, in practically all cases, requires motors with 4 to 1 speed variation and suitable controllers. The speed limit of the motors should be approximately 1,000 revolutions per minute. To meet these requirements the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, has developed a line of motors and controllers for rubber calender drives, designed for operation on two voltages—115 and 230 volts direct current. This method has been adopted, due to the fact that electrical equipment for calenders can be made somewhat cheaper if used on a two-voltage circuit rather than a single-voltage circuit, and there is very little difference between the cost of providing either a two-wire or a three-wire circuit. As a matter of fact, in practically all large rubber plants two-voltage, direct-current circuits are used to secure power for the calenders.

As a rubber calender represents a constant torque application, a motor of sufficient capacity to provide the required torque at high speed will take care of the power requirements throughout the whole speed range. The motors furnished for calender drives have a two to one speed range by field control.

The controllers furnished provide approximately a 6 to 1 speed variation by means of armature and shunt field control on the two-voltage circuit. They also have a "threading in" point which gives a speed of approximately 50 per cent of normal low running speed by means of armature control. This threading in point is used when starting up the calender after it has been stopped. Acceleration is automatic up to the setting of the master switch handle, and is controlled by shunt contactors with mechanically interlocked accelerating relays, and by field accelerating relays. Emergency stop with dynamic braking is obtained by a slack cable switch, which can be operated by rope, or by another suitable means, and must be reset by hand. The design of these controllers is such that there is no slump in speed when decelerating from 230 to 115 volts. The operation and features of the controllers in brief are as follows:

Starting and speed acceleration is obtained by a drum type master switch. A starting push button is also furnished, by means of which the calender can be started and automatically



accelerated to speed corresponding to the setting of the master switch. One of the line contactors is provided with a back contact, which gives dynamic braking on the motor when the calender is shut down, either by means of the slack cable switch or the master controller. This assures stopping of the calender quickly. A two-pole, double-throw knife switch is also provided to permit quick reversing of the calender. The controllers, however, are not designed, nor are they required to operate in the reverse direction. Overload and no-voltage protection is provided.

The controller shown on the left in the illustration is one for use with motors varying from 75 to 150 horse-power in capacity. The line and transfer contactors shown on the bottom panel are of 500-ampere capacity. The accelerating contactors shown on the upper portion of the panel have a capacity of 250 amperes. The panel on the right is for use with motors having a capacity of 125 horse-power and upwards. The main line contactors and transfer contactors have a capacity of 1,250 amperes, and the accelerating contactors are of 500-ampere capacity.

ARTIFICIAL DAYLIGHT LAMP FOR COLOR WORK.

Rubber chemists engaged in preparing and matching colored rubber stocks will appreciate the Scimatco lamp.

The annoyance and loss frequently sustained by insufficient or improper illumination, or by delays spent in waiting for sunlight, have been looked upon as necessary evils. The Scimatco artificial daylight lamp has removed completely the risk of these losses and made it possible to ignore the weather and the hour in making color comparisons because the light produced is spectro-scopically identical with daylight. [Scientific Materials Co., Pittsburgh, Pennsylvania.]

*Denotes patents for American inventions.

The Editor's Book Table.

THE FINANCIER RUBBER SHARE HANDBOOK. Thirteenth Edition. April, 1916. The Financier & Bullionist, Limited, London, England. [Cloth, 8vo, 860 pages. Price, 3*s.* net.]

THIS convenient handbook has a wealth of information regarding the many stock companies owning rubber plantations in the Far East, South America, Africa, and other rubber producing countries. It gives the authorized share capital of each of these companies, the amount issued, the balance sheet, the list of directors, acreage and similar information, well arranged and quickly available. Besides this an alphabetical list of directors in all these companies is given, including a list of secretarial groups in London, with the addresses and telephone numbers. In the preface is given the world's production of rubber in 1915, and it may be well to print in this connection, for comparison, the production of previous years, as given in the 12th edition of this handbook. The figures are as follows:

	Plantation.	Brazil.	Rest.	Total.,	Increase, Per Cent.
1915.....	106,989	37,220	12,615	157,824	31.0
1914.....	71,380	37,000	12,000	120,380	11.0
1913.....	47,618	39,370	21,452	108,440	9.6

In the thirteenth edition Mr. Killick, rubber expert of the "Financier," gives as the probable total output for the year 1916, about 200,000 tons. He says that a low price for the commodity tends to restrict production, more especially of wild rubber, which is far more expensive to collect than plantation. However, he considers that the present price standard leaves a sufficient margin of profit for the Brazilian industry to continue as before.

Speaking of the maturity yield of rubber per acre, it is considered that 400 pounds an acre is about the proper figure on which to base calculations, though estates are mentioned whose yield was far higher, in one case, the Seafield Estate in Selangor, yielding 682 pounds per acre from 124 acres planted in 1904, and from the entire area in tapping (1,940 acres) an average of 439 pounds.

Regarding investments, Mr. Killick believes that the share market value of estates of the Pataling type may be quite common in years to come, from the fact that an acre of *Hevea* yielding 400 pounds of rubber at 1*s.* a pound profit per year is worth £200 capital.

INDIA RUBBER AND BALATA BELTING AS CONVEYOR AND Power Transmission Belts. An address by James Tinto before the Manchester Association of Engineers. [Pamphlet, 16 pages.]

Mr. Tinto, of the Irwell & Eastern Rubber Co., Limited, Manchester, England, in this address gives some account of the introduction and history of rubber belting. He describes minutely the manufacture and tests for transmission and conveyor belts. Of the latter, he mentions some of the largest or longest in use, going into details and figures. He quotes from a friend in America, that the rubber belting trade totalled $18,000,000 in 1914 and $26,000,000 in 1915. He mentions the many industries where conveyor belts are used, and gives particulars of such use in the New York Post Office Station at the Grand Central Station, described in THE INDIA RUBBER WORLD, September 1, 1915.

For the introduction of balata belting, he credits R. & J. Dick, of Glasgow, who made this in 1884, and in 1885 secured a patent. For balata belting he claims the following qualities: Freedom from shrinkage, resistance to stretch, great tractive power, solidity of texture, great durability, absolute uniformity throughout, unequaled transmitting ability, perfect balance and flexibility, steam and water proof.

A weakness of balata belting, he states, is its inability to stand heat. It should not be exposed to a temperature of more than 100 degrees F. Neither should it be used where it is liable to come in contact with oils, particularly mineral oils. He states that balata belts have been proven superior to any other for electric lighting of trains, the power being driven from the axle under the body of the coach. Such belts are exposed to varying speeds, and all kinds of weather and subjected to unusual abrasive wear.

The pamphlet is illustrated with half-tones of a number of unusually large belts made by the corporation with which Mr. Tinto is connected.

LARGE SINGLE VERSUS DUAL SOLID TIRES FOR REAR TRUCK Wheels. By W. H. Allen, manager Truck Tire Department, The B. F. Goodrich Co., Akron, Ohio.

In a paper presented at the semi-annual meeting of the Society of Automobile Engineers, Mr. Allen announces his opinion in favor of the use of large single wheel rear truck tires instead of smaller dual tires. He maintains that dual tires are overrated and that the statement that dual equipment is capable of carrying loads double that of one of the singles of the pair, is open to discussion. His reasons for advocating large single in place of small dual equipment are that the contact area of the former exceeds that of the dual it replaces. The load per square inch is distributed over a reduced contact area. Small dual equipment does not give satisfactory performance, for the reason that neither single tire is sturdy enough under certain conditions. Also, with the single tire equipment, costs are reduced from 8 to 15 per cent. Wheel cost is less because of the narrower felly and wheel rim, saving in wheel, tire and rim weight. Other advantages are, easier fitting of non-skid chains, better trackage with front wheels, greater height of rubber tread, providing better cushioning properties and increasing tire life, and less strain on the axle and wheel bearings. Mr. Allen states, however, that the large single tire has its limitations, and pending results of further investigation, he deems it advisable to consider 7-inch tires as the limit of practical single equipment.

PREPARING PLANTATION RUBBER FOR THE MARKET. Annales des Planteurs de Caoutchouc de l'Indo-Chine No. 49. Saigon, Cochin China.

The report of a recent meeting of the Rubber Planters' Association of French Indo-China gives in detail the discussion on methods of preparing crude rubber for the market. Naturally, opinions differed. A member who had just returned from inspection of plantations in Java claimed that crêpe offered advantages of rapid preparation and enabled planters to ship the crude rubber within a week of collecting the latex.

Honorary President Le Croispellier is of the opinion that crêping destroys the "nerve" of the rubber. Manufacturers prefer sheets to crêpe, but it is immaterial whether the sheet be smoked or not. As practiced, the smoke is not incorporated with the rubber, but is merely a surface deposit, and gives no added value, unless as an outside protection against mold. Smoked sheet must be washed more than crêpe. The premium on smoked sheet has rapidly dwindled.

Attention was called to Perrot's book on the London Rubber Show of 1914, in which the block process was described. President Croispellier stated that he considered Perrot a theorist, having little practical knowledge on the subject. Regarding block rubber, however, it was said that Michelin, the tire manufacturer, gave minute directions for preparing the rubber as he

preferred it. These were: First, no coagulation by acid, and no machinery. There should be a pure and simple desiccation of fresh latex, poured into pans to a depth of 1½ to 3 inches, placed in a well-ventilated place, protected from sun and dust, for several days. The film of rubber should be removed and, if necessary, dried between blotting paper, and it is then ready to ship.

Dr. Versin, who sells large amounts of rubber to Michelin at highest quoted prices for first latex crêpe on the day of delivery, was said to have written that his method was simply preparation by natural coagulation, moderate washing between fluted rolls, drying eight days and compressing into blocks for packing. It was stated by M. Cremazy that Michelin had said he did not know how to vulcanize all the kinds of rubber he received, and that he had experienced so much trouble from this source, that he contemplated going into the planting business to raise and prepare all he required.

The conclusion was, that manufacturers' ideas were so divergent, and their manipulations so different, that it would be impolitic for all planters to unite upon any one process for preparing rubber for the market.

NEW TRADE PUBLICATIONS.

A NEAT little booklet entitled "The Mill by Stony Brook" gives a brief outline of the history of india rubber, and the establishment and growth of the Boston Belting Co. Pictures are shown of the original factory, and of the seven principal buildings of the present plant, and also miniature reproductions are printed of various diplomas and awards received by the company for its belting.

* * *

The bicycle is coming back into popularity, perhaps not to the extent of pre-automobile days, but manufacturers are finding a good sale for the modern up-to-date bicycle. The Fisk Rubber Co., Chicopee Falls, Massachusetts, has published a neat booklet entitled "How to Form a Fisk Club," which is intended to interest boys and girls in bicycling and, indirectly, to help the sale of Fisk bicycle tires. The book, which is pocket size, gives information on how to organize a club, a list of officers to be chosen, signals for the road, by-laws and parliamentary rules for procedure of business meetings; also instructions in signal flag drills and suggestions for club runs. The company is careful to note that it is not intended that boys who are not using Fisk tires should be barred from membership in Fisk clubs, but that any boys should be allowed to join who wish to do so. The company has made an offer of a free set of fancy colored non-skid bicycle tires to the secretary of each of 100 best Fisk clubs. A full description and a price list of the Fisk tires is given at the end of the pamphlet, and a bird's-eye view of the company's plant is shown on the back cover.

* * *

Harrison Brothers & Co., Inc., Philadelphia, Pennsylvania, are sending out a little publication entitled "Our Battle with the Iron-Eaters," which is made up principally of fac-similes of testimonials from many leading manufacturing concerns praising "Antoxide" which, as its name indicates, is a preparation for the prevention of rust on metals. Very little is printed except these letters, which are sufficiently strong in themselves to form a good advertisement for the preparation. The first page has a fac-simile of a rust-eaten iron plate which is oxidized to the extent that a portion has been entirely consumed. The whole is bound with a red silk cord.

* * *

The B. F. Goodrich Co., Akron, Ohio, is sending out to the trade a handsome lithographed hanger, a reproduction of a painting begun by the late A. B. Frost, one of the last works of the famous artist, left unfinished, and later taken up and finished by his son, John Frost. It represents the main street in a country town, where the constable has held up a dapper feminine motorcyclist for speeding. The expressions on the faces tell the entire story, in Mr. Frost's best style. The hanger is entirely without advertisements, with the exception of the Goodrich sign in the village store in the background. Undoubtedly this hanger will find a prominent place in many offices and rubber stores.

* * *

W. T. Henley's Telegraph Works Co., Limited, London, England, is sending out some attractive and informative booklets, descriptive of the tires of its manufacture. Two booklets are of the catalog class, picturing, pricing and describing, one the solid band tires, and the other the pneumatic tires, which are denominated "All-British," with a parenthetical clause "made in England by British Labour." A third pamphlet treats of the "Cause and Prevention of Abnormal Wear of Solid Tyres," and the fourth, "Science and Tyres," gives a description of the processes of manufacture, illustrated by a number of small but clear half-tones of the various machines, mills, presses, vulcanizers, etc. This latter booklet also gives some directions for the care of tires, and descriptions of tubes and treads of the Henley make.

* * *

The Brictson Manufacturing Co., Brookings, South Dakota, sends out a very finely printed pamphlet describing its tire and giving facts regarding the same. The cover of the book has a fine half-tone engraving of an automobile wheel with a steel-studded, leather-covered tire, each stud being printed in gold and embossed in high relief. The catalog is one which would receive more than a passing glance because of its attractiveness.

POSTERS ADVOCATING PREPAREDNESS.

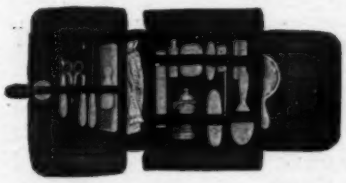
The Rubber Club of America, Inc., is certainly doing its share in the national preparedness campaign. About the middle of last month the committee on preparedness sent out to every rubber manufacturer a set of seven posters which had been prepared by the Patriotic Education Society and the National Security League. Most of these posters are nearly two feet by three feet. Two of a smaller size, however, are fully as noticeable, because they are printed in the national colors. All of these preach preparedness and are intended to be posted in offices and factories to promulgate the views of this society and league. Each poster takes up some one vital phase of the issue and points out the urgency with which Congress should adopt the recommendations of military and naval experts. The Rubber Club is also distributing a convincing and readable book on "Peace Insurance" by Richard Stockton, Jr., the purpose of which is sufficiently indicated by its name. The preparedness committee of the Rubber Club is to be commended for the energy with which it is entering upon the duties assigned it.

MILL-PANTS AND RUBBER BOOTS.

A thoroughly efficient clothes protector for work in mills, rubber factories and garages is afforded by the mill-pants and rubber boots here illustrated. The pants are made of heavy cotton material, rubberized. They are supported by shoulder straps and fit closely over stout rubber boots, which are made according to the specifications of the individual customer. This outfit is also well adapted for fishing and wading, or any occupation which necessitates protective covering from water or greasy substances. A similar garment is made entirely of rubberized material, to be worn over the wearer's trousers and shoes. [Alfred Hale Rubber Co., Boston Massachusetts.]

"UTILITY ADAPTO" TRAVELING CASE.

The traveling case of waterproofed double texture fabric here illustrated is made to suit individual fittings, thus eliminating the necessity for ready-fitted cases, which are generally very expensive and do not always suit the customer's ideas or requirements in every particular. All articles are held securely in place by adjustable, self-holding straps. The slots in the slip strap are less than an inch apart, one or as many as necessary being used to accommodate the various pieces. Large pockets hold the wash cloth, towel, nightdress, etc. When closed, the case lies perfectly flat, as shown in the second illustration, and can easily be tucked away in a suitcase, trunk or automobile. These traveling cases are furnished in leather, cretonne, linen, silk and other novelty fabrics with a foundation of waterproofed double-lined material. [The Stern Specialty Co., New York City.]



THE "RADIO" DATER.

This is a new dating stamp of the dial variety. Its indicator dial is arranged, as will be noted, around a nickeled rim on a vertical cylinder revolved by turning the handle of the dater.

A novel feature of this stamp is the molding of the printing die containing the day dates in one piece with the cushion; others are the molding of the cushion piece in two close-fitting parts, and the insertion of brass linings in the mortises carrying the date blocks. The stamp represents the latest improvement—especially as regards its rubber features—in dial daters, an extensive line of which has been included in the company's productions for many years. [The R. H. Smith Manufacturing Co., Springfield, Massachusetts.]

STANDARD ENVELOPE SEALER.

An ingenious use of rubber is shown in the Standard Envelope Sealer where a canvas belt, with pointed rubber projections,

is used to convey and propel the envelopes, while two rubber stripping fingers combine to regulate the feed and to prevent more than one envelope at a time from passing through the machine.

The envelopes are placed in the feed hopper. The endless belt pulls the under envelope out, carrying it along to the moistening tank; a blade opens the flap and passes it over a moist felt, then it is delivered under a sealing plate and into the receiving hopper. The machine is mounted on six rubber feet and has a rubber plug for the tank. [Orrin S. Lyon Co., Metropolitan building, New York City].

BALLOON NOVELTIES.

The new design in balloons, shown herewith, is appropriately named "Old Glory," having an American flag printed upon it in the red, white and blue of the stars and stripes.

A life-like representation of a watermelon, also shown, is a unique novelty now offered in balloons. It is large size, of an attractive green color and is furnished in plain green or decorated with a two-color design, simulating a piece of watermelon, along one side. This attractive toy is made to please the youngsters' desire for noise, a squawker being used as an inflater, giving forth a more or less musical sound in the deflation. A silent style, likely to be more popular among adults, has a special closing

valve which holds the melon in shape until deflation is desired. [The Faultless Rubber Co., Ashland, Ohio.]

WORKMEN'S PROTECTIVE GLOVES.

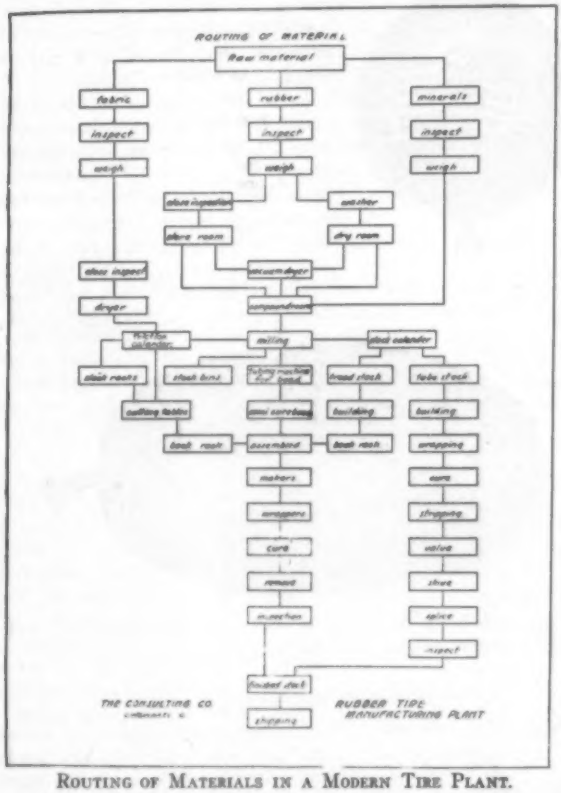
Analyses of industrial accidents show that the hands and fingers are more frequently injured than any other members, and this is probably as true of rubber mills as of any other line of manufacturing plants. Handling the molds and machinery is always more or less dangerous and the use of knives and hand tools requires protection to prevent blisters. A strong and serviceable pliable glove for rubber workers who need forefinger and thumb protection is shown here. This leaves parts of the hand free while affording such protection where it is needed. It is made of a heavy textile material reinforced with leather patches.

Another glove, used mostly in foundry and shop work but also useful in handling hot molds, shows a leather patch on the thumb sewed in with steel ribbons so that it cannot pull out, while additional strips of tough leather sewed in with steel thread reinforce the palm and fingers and insure the worker protection against heat and abrasions. [W. H. Salisbury & Co., Inc., Chicago, Illinois.]

THE ROUTING OF MATERIALS IN A MODERN TIRE PLANT.

IN planning a manufacturing plant the first requisite is that the materials and the articles manufactured shall be advanced from one process to the next by the most direct route, with no duplication of handling. The layout of the entire plant should be planned to this end. The diagram shows the routing of crude rubber, compounding ingredients and fabric, step by step to the finished tire casing and inner tube, in an up-to-date tire plant.

This diagram is the key to the location of the store rooms, dry rooms, working departments, machinery, tools and equipment,



ROUTING OF MATERIALS IN A MODERN TIRE PLANT.

which should be placed and arranged to permit progress of materials through the necessary processes to the finished product with the least possible deviation from a straight line. The planning should also allow possible enlargement of departments with but a minimum of disturbance of the existing plant.

Low cost, known exact cost, decreased damaged stocks and finished goods, full time and consistent production from the worker, a maximum output from equipment,—all these are necessary for success, and a well-arranged and thoroughly organized plant makes this success far better assured than one built and run under the old "rule-of-thumb" method.

TIRE AND RIM STANDARDS COMMITTEE.

The Society of Automobile Engineers has a new division of the Standards Committee to be known as the Tire and Rim Division, of which H. L. Barton is chairman. The other members of the committee are as follows: W. H. Allen, C. C. Carlton, J. E. Hale, Russell Hoopes, C. B. Whittelsey, C. E. Bonnett, John Kelsey, J. V. Mowe, J. C. Manternach, C. B. Williams, E. K. Baker, J. C. Cole and Christian Girl. Most of these men were formerly on the Truck Standards Division, or the Pleasure Car Wheels Division, which latter was discontinued last year. The new division will have charge of standardization work in regard to solid and pneumatic tires, rims, felly bands, etc. It will therefore take up some of the incomplete work upon which the Truck Standards Division has been working, including the following subjects: Carrying capacities of solid tires; carrying capacities and inflation pressures of pneumatic tires; depth of solid metal rims for demountable solid tires.

EUROPEAN TIRE DIMENSION ANOMALIES.

THOSE who have had occasion to measure European pneumatic automobile tires, for fitting speedometers, or for other purposes, have noted that the metric measurements indicated on these tires very seldom correspond with their actual dimensions. For instance, a tire marked 760 x 90 millimeters [29.92 x 3.54 inches] does not actually measure 760 millimeters in diameter; nor does an 880 x 120 millimeters [34.65 x 4.72 inches] tire actually measure 880 millimeters. Here is the reason:

In the early days of the automobile tire industry, when Michelin, the pioneer, began to make "large tires"—large when compared with the 65 millimeter [2.56 inches] section tire which was the first type of automobile tire produced—he made them according to his own judgment, and in sizes demanded by automobile manufacturers, without any idea of the dimensions corresponding with even numbers of centimeters. He made inner tubes of 105; 120; 135 millimeters [4.13; 4.72; 5.32 inches], all of which could be fitted to rims of approximately the same size, and he adopted the method, still in vogue today in Europe, of designating automobile tire sizes by two numbers, the first referring to the diameter of the wheel with the inflated tire upon it, and the second relating to the sectional diameter of the tire.

It was soon found that chauffeurs experienced difficulty with the fractions of centimeters in ordering tires and, to make it an easy matter for them to remember tire sizes, Michelin decided to have the two numbers designating the tire terminate with the same figure or figures having a similar consonance when named in the French language. For instance, 810 x 90, stated in French is *huit cent dix, quatre-vingt-dix*. This was the origin of the automobile tire size designations that today are still current in Europe, and of which the principal ones are as follows:

Millimeters.	Equivalents in Inches.
810 x 90	31.89 x 3.54
815 x 105	32. 9 x 4.13
820 x 120	32.28 x 4.72
870 x 90	34.25 x 3.54
875 x 105	34.45 x 4.13
880 x 120	34.65 x 4.72
895 x 135	35.24 x 5.32
910 x 90	35.83 x 3.54
915 x 105	36.02 x 4.13
920 x 120	36.2 x 4.72
935 x 135	36.81 x 5.32

Michelin adopted these designations arbitrarily, without making any changes in the actual sizes of the tires, the numbers marked upon them being changed to suit euphony and to make them easy to remember. Hence the anomalies and confusion.

In a number of these confused designations, however, the figures referring to the sectional diameter of the tires represent approximately the correct measurements of the casings, not when they are new, but after they have covered several hundred miles. New tire casings swell during the first few hundred miles of their wear and an 820 x 120 millimeters [32.28 x 4.72 inches] casing, that measures when new a little more than 110 millimeters [4.33 inches] in sectional diameter, will measure its full 120 millimeters [4.72 inches] after running from 200 to 300 miles.

As far as the exterior diameter of the tire is concerned, the designating numbers marked on European millimeter tires are never more than approximate.

MOISTURE CONTENT OF AUTOMOBILE TIRE FABRIC AND ITS INFLUENCE UPON THE WEIGHT AND TENSILE STRENGTH.

*By Walter S. Lewis and C. J. Cleary.**

IT is well known that cotton fiber is hygroscopic. The extent to which it will absorb or give up its moisture content depends upon the condition of the material and the relative humidity and temperature of the air by which it is surrounded. Under changing atmospheric conditions, tire fabric may sometimes vary in moisture content from 3.5 to 8.5 per cent.

Automobile tire fabric is usually sold in rolls of from 100 to 500 yards each. In some instances moisture is intentionally added to the cloth when it is rolled for shipment. This moisture is sometimes added to increase the weight and strength of the fabric and sometimes to improve its appearance. Cotton tire fabric under such conditions may contain from 3.5 to 10.5 per cent of moisture per 100 parts of dry material.

The quantity of uncombined water present in the fiber has a marked influence upon the weight and strength of the fabric; to a less degree, the width and elongation and the crimp of the yarn.

From preliminary tests upon combed Sea Island tire fabric the results have shown that for each 1 per cent of moisture content, upon the basis of 100 parts dry material, there is an increase in tensile strength of approximately 7 per cent. This ratio of strength to moisture content was based upon results obtained from tests upon fabrics which contained from 0 to 10 per cent of moisture.

If dry fabric, therefore, has a tensile strength of 200 pounds per inch of width, it would test 249 pounds with 3.5 per cent moisture, 319 pounds with 8.5 per cent, and more than 325 pounds with 10.5 per cent moisture content. There is thus a difference of 70 pounds in tensile strength of the same fabric caused by a 5 per cent difference in its moisture content, *i. e.*, between 3.5 per cent and 8.5 per cent.

A consideration of the variation in weight of fabric is also important, especially when it is bought upon the pound basis. What is known as a 17¼-ounce tire fabric, under so-called normal atmospheric conditions, will weigh approximately 16½ ounces under bone-dry conditions. Therefore, with 3.5 per cent moisture it would weigh 17.08 ounces and with 8.5 per cent moisture 17.90 ounces per square yard, a difference of about 5 per cent in weight. On a roll of 500 yards a difference of 5 per cent in weight would mean 25 pounds.

Many tests for the determination of moisture have been made during the past year upon 17¼-ounce tire fabric. The particular fabrics employed in this preliminary investigation were produced and tested by four prominent cotton mills, three located in the North and one in the South, and all tests were made upon cloth which did not have moisture added artificially when being wound into a roll. In other words, the rolls were shipped in box cars to the purchaser as wound under the normal conditions of the mill. The rolls were sometimes exposed for a few days only, while in other instances they were exposed for weeks to the different air conditions that obtain in the winter months in unheated cars and during the summer months in ordinary box cars.

The tests included altogether more than 200 rolls and more than 400 samples were tested. The results were as follows:

	Percent.
Mill No. 1	4.6
2	4.8
3	5.4
4	4.6
Average	4.85

The extreme variation of moisture was between 3.5 and 6.5 per cent, no single sample reaching as high as 7 per cent.

*From Technologic Paper No. 68 of the Bureau of Standards.

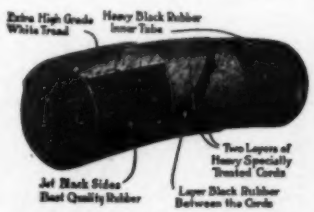
EMPIRE RED TIRES AND TUBES.

A bright red color is the distinguishing feature of Empire tires and tubes that are said to deliver the maximum mileage with a minimum cost per mile. The casing and tread of the non-skid tire are made of a durable red rubber compound which, combined with dependable fabric base, has shown, according to the manufacturer, superior strength and wearing qualities on the road. The red tubes are thick, tough and elastic and can be repeatedly repaired.

The best quality of rubber and effective curing are the basic factors that are carefully considered by the makers of Empire tires and tubes. All sizes and types of oversizes are furnished, only in red, however, including Clincher, Q. D. Clincher and Straight Edge tires with tubes to correspond. [Empire Rubber & Tire Co., Trenton, New Jersey.]

THE KOKOMO "KORD" BICYCLE TIRE.

A bicycle tire that, according to its manufacturers, is immune from the effects of stone bruises and is much harder to puncture than the ordinary kind, is of special interest to bicycle riders and dealers. As the illustration shows, it is made up with an inner air tube of heavy black rubber; a layer of strong, specially treated cords, laid diagonally; a layer of black rubber, another layer of cords laid transversely to the first, and over all the outer covering of best quality black rubber and a non-skid tread ribbed longitudinally. It is claimed that the "Kord" tire loses nothing in resiliency and is easy to repair. [The Kokomo Rubber Co., Kokomo, Indiana.]



THE LANCASTER WIRE GRIP TIRE.

"A wire grip tire with a thousand claws" is the pointed statement that is intended to attract public attention to the non-skid puncture resisting qualities of the Lancaster tire.

The non-skid and the resistance-to-puncture effects are obtained by four spiral coils of steel wire that completely encircle the the tire and are vulcanized in the tread, near the surface. After the tire has been used for a few miles, the wires wear through, forming thousands of steel points that grip the road. Moreover, the closely intermeshed wires shield the tread, thus protecting it against glass and tin. Reinforced by the wire coils and strengthened

by extra heavy fabric, the side walls of the casing are claimed to be practically proof against blow-outs. [The Lancaster Tire and Rubber Co., Lancaster, Ohio.]

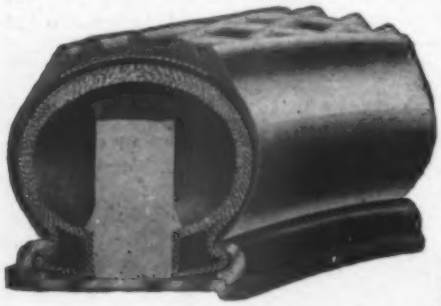
AN ENGLISH COMBINATION NON-SKID TIRE.

It is a well-known fact that rubber non-skid treads hold better on dry than on wet pavements. It is equally true that steel-studded treads hold better on wet than on dry pavements. Therefore, the Henley combination non-skid tread with steel studs and V-shaped rubber projections should hold well in all conditions of weather.

This tire is built up on an extra stout casing, with a generous thickness of rubber on the walls and a non-skid tread composed of thick V-shaped blocks of solid rubber and toughened steel studs. The rubber blocks act as a protection to the steel studs, and also permit of the power being transmitted to the road without the sudden spinning of the rear wheels and loss of studs which so often occurs when steel studs only are used. [W. T. Henley's Telegraph Works Co., Limited, 18 New Union street, Moorfields, London, E. C., England.]

PUNCTUREPROOF TIRES.

It is claimed that the problem of eliminating air and still retaining the resilient qualities of a pneumatic tire has been solved by the King tubeless tire. This universal desideratum is based on the unusual mechanical construction of the tire which is shown in the illustration.



TOURING CAR TYPE.

The inside web and casing are molded in one piece, and are really a part of the tire. The web is a composition of rubber which takes the place of the inner tube in a pneumatic tire. It carries the load and is provided with two angular braces which rest directly over the bead when locked in the rim. These braces form a support to the web and also prevent any lateral motion of the tire, under severe loads or high speed. This web from the rim up to the dark line shown in the cut is figured as equivalent to 70 pounds of air in the inflated tire. Between this and the tread is placed a cushion, having a resiliency equal to only 40 pounds of air, which produces an easy effect upon the car. They are made in different types for touring cars, electric and light commercial vehicles and trucks; can be placed on any clincher or straight side rim and are guaranteed for 8,000 to 10,000 miles. [The Punctureless Auto Tire Co., Akron, Ohio.]

THE TWELVE-INCH TIRE.

The 12-inch tire is scarcely likely soon to become a formidable rival of the automobile tire of standard size, in public popularity, but some very interesting "stunts" may be accomplished on tires of this size—by those skilled in their performance. We reproduce a photograph of Ed. Mayer in a vaudeville act in which, under the name of Francis Le Maire, he has gained popularity through his performance on monocycle skates, equipped with 12 x 1-inch tires. As will be noticed, the position of the foot in skating is on top of, or directly over, the wheel, a particularly difficult one to maintain.

Mr. Le Maire—or Mayer—has also attained distinction in amateur bicycle racing in the West, and in all of these events,

as well as in his stage equipment, he uses Palmer tires, made by The B. F. Goodrich Co., Akron, Ohio.

A NEW TIRE ACCESSORY.

Here is a device that stands for preparedness when the motorist encounters deep, sandy roads or faces the possibility of being stuck in the mud.

It will be seen by referring to the illustration that it is an exceedingly simple contrivance made of metal, fitting snugly around the curve of the tire and held in place by a leather-covered chain passing around the felly. It is comparatively light in weight yet amply strong enough for the purpose for which it is designed. A pair of these trouble savers occupies only a small space in the tool box, and doubtless the day would come when they would be used to good advantage.

When power is applied, the "Dig-U-Out," as it is called, prevents the wheel from slipping by acting as a lever, and practically lifts the car out of the deep mud or sand. It is made in 5 sizes, for pleasure cars and trucks, fitting both pneumatic and solid tires. It is confidently expected that this invention will be used on United States Amy trucks in Mexico. [The Protex Co., 1790 Broadway, New York City.]

The Obituary Record.

INVENTOR OF IMPORTANT RUBBER MACHINERY.

JOHN H. PEARCE, at one time superintendent of The L. Candee & Co.'s plant at New Haven, Connecticut, and an inventor of note in rubber machinery, died at his home in New Haven, Connecticut, June 12, aged 61 years. Mr. Pearce was a native of Montreal, Canada, where he spent the early part of his life, starting in business with the Canadian Rubber Co. Eight years later he entered the employ of the Boston Rubber Shoe Co. at Malden, Massachusetts, and from there went to the Lycoming Rubber Co., Williamsport, Pennsylvania, and in 1884 was transferred to The L. Candee Co.'s plant, where he rose to the position of superintendent. Some years ago he went back to Montreal to occupy a prominent position with the Canadian Consolidated Rubber Co. Two years ago he returned to New Haven and arranged for the formation of a new company, in connection with E. E. Carll, to manufacture footwear, soles and heels, as well as tennis and sporting goods, and he had made considerable progress towards securing the capital for this purpose at the time of his death. Early in the present year he submitted to a surgical operation which was supposed to have resulted successfully, although he had not been in the best of health since that time. On the date mentioned he was seized with hemorrhages and, in spite of prompt measures taken for his relief, his death occurred the same evening. He was well known in the rubber business through his connection with these prominent rubber companies and for the inventions of the automatic mixer and feeder bearing his name, and several styles of calenders, used mainly in the manufacture of shoes and sheeted goods, while several minor inventions of value in the manipulation of rubber are recorded to his credit. Mr. Pearce was a thirty-second degree Mason. He is survived by a wife and three sons, all of New Haven, and by one brother, Richard N. Pearce, of Boston.

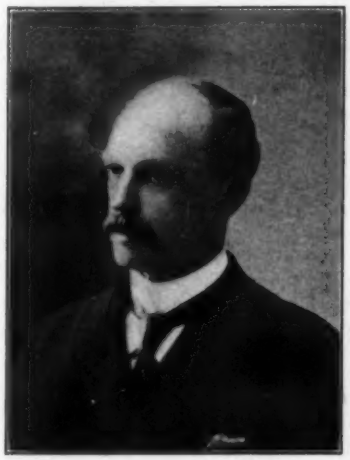
J. H. PEARCE.

AN ELECTRICAL EXPERT.

James T. Phelps, for many years associated with the National India Rubber Co.'s plant at Bristol, Rhode Island, died at his home, 100 Franklin street, that town, on the night of Friday, June 16, from a complication of diseases, including a hurt he received three weeks previously, in a fall at his home. He was born in Bristol in 1840 and served with distinction in the Civil War in the Seventh Rhode Island Volunteer Infantry, enlisting as a private and rising to First Lieutenant, after being severely wounded at Petersburg, Virginia, on September 20, 1864. He removed to Bristol from New York City in 1870 and took charge of the electric department of the National India Rubber Co., where he remained many years. He introduced the first electric street lights in Bristol at the time of the town's bicentennial in 1880 and also installed the first telephone system in that town. He is survived by his wife and one son.

A FAITHFUL AND EFFICIENT AUDITOR.

James T. Halland, of the auditors' office of the United States Rubber Co., New York City, died recently at his residence on Staten Island, New York. He was born in St. James' Parish, London, England, December 8, 1851. Upon completing his education at St. Marks' College in that city, he trained for an accountant, and at the age of 25 went to New Zealand, where he followed that vocation, and after ten years returned to England. Later he decided to come to America, and he entered the employ of George Watkinson, at Colchester, Connecticut, in November, 1892. Two years later he went to Providence, and in 1895 was transferred to the New York offices of the United States Rubber Co., to take charge of the work in the auditing division, remaining there with steadily increasing responsibilities up to the time of his death.



J. T. HALLAND.

Mr. Halland married Fanny Lavarart, of London, in 1872, who survives him. He was a member of the Episcopal Church and occupied the office of vestryman in All Saints' Church, Orange, and later in Grace Church, Nutley, New Jersey. He was a solo singer for nine years in the first mentioned church and was also president of the Mendelssohn Union of East Orange. He was a Master Mason and a member of the Royal Arcanum. Mr. Halland possessed a genial disposition, was popular among his business associates, and leaves a wide circle of friends to mourn his loss.

HEAD OF AN IMPORTANT DEPARTMENT.

Otto P. Huebon, head of the wire department of The B. F. Goodrich Co., Akron, Ohio, died suddenly in East Orange, New Jersey, on May 13, at the age of 45 years. Mr. Huebon contemplated undergoing an operation within a few days after returning to Akron. He was born in Germany. His wife died last December and he was buried in the same plot with her in Yonkers, New York.

EXPLORED IN RUBBER PRODUCING COUNTRIES.

Frank Vincent, author of "Through and Through the Tropics," "Around and About South America," "Actual Africa," and "The Land of the White Elephant," died June 19 at Woodstock, New York. He was 69 years old. Mr. Vincent was a noted explorer and traveler, particularly in India, but other explorations were in Brazil, Congo Free State, Lapland and Indo-China.

A PROMISING YOUNG MAN.

Eugene Clifton Squires died June 7, at Grand Rapids, Michigan, aged 19 years. He was the youngest son of Arthur C. Squires, the veteran rubber man, and at the time of his death was associated in the retail rubber business with his brother, Arthur R. Squires, in the Squires Rubber Co., of the above mentioned city.

E. C. SQUIRES.

Born in Brooklyn, New York, June 5, 1897, where his boyhood days were passed, he later moved to Akron, Ohio, with his parents and attended the High School in that city, finishing his education at Keyport, New Jersey, where he also learned the rudiments of the rubber business under the direction of his father.

He soon developed an aptitude for drawing and mechanical design, that was applied in his study of rubber manufacture and its devices, in which he was particularly interested.

He will long be remembered by his many friends and business associates for his frank, genial manner and lovable disposition.

Henry S. Jones, formerly with the Converse Rubber Co. and later a valued employe of The B. F. Goodrich Co. at its Boston, Massachusetts, office, died at his home in Stoughton, Massachusetts, June 4, aged 65 years.

The many friends of A. R. Duryee, the veteran rubber superintendent, will share with him his sorrow over the loss of his son Robert, who died recently at Saranac Lake, New York, at the age of 18.

JUDICIAL DECISIONS.

I. J. COOPER RUBBER CO. VS. JOHNSON. A suit was instituted by the I. J. Cooper Rubber Co., an Ohio corporation, to recover from Johnson and others, as sureties on a bond executed by the Standard Vulcanizing & Tire Co., a Tennessee corporation, as principal.

Following the terms of a contract, the rubber company consigned tires to the Tennessee corporation which had executed a bond to secure the rubber company against breach of contract by the Standard Vulcanizing & Tire Co.

The defense of the sureties was that the complainant rubber company had not complied with the Tennessee foreign corporation acts, and was doing business in that State through the agency of the tire company; that it could not, therefore, maintain the suit. The Chancery Court sustained this defense. The plaintiffs appealed and the Supreme Court of Tennessee reversed the decision of the court below. Held, that a foreign corporation which consigned tires for sale to a company in the State, was not doing business within the State to render necessary compliance with the foreign corporation act as a condition precedent to its right to recover from the sureties, since the business of a factor or commission merchant, one whose business is to receive and sell goods for commission, is not the conduct of an agency or business for the consignor of the goods. The factor sells to customers at his own risk and the consignor does not exclusively own the proceeds (182 Southwestern Reporter, 593).

BLACKWOOD TIRE & VULCANIZING CO. VS. AUTO STORAGE CO. The defendant sold an automobile to one Cooper, retaining title. Thereafter Cooper bought from the plaintiff, and fitted to the machine, certain tire casings; plaintiffs not retaining title. The machine was not fully paid for and the defendant took possession, and sold it. Cooper made no claim to the tires when defendant acquired the machine and made no objection to its sale. After the sale, however, at the instance of the plaintiffs, Cooper sold, or purported to sell the tire casings to the plaintiff, their value at that time to be credited on Cooper's account. Suit was brought on this alleged title and the tire casings were replevied. The trial court dismissed the suit and an appeal was taken before the Court of Civil Appeals, which affirmed this judgment. Appeal was then taken before the Supreme Court of Tennessee. Held, that both courts were correct, that, where the purchaser of an automobile (title to which is retained by the seller) fits the machine with tires, and the seller on non-payment recovers the machine, title to the tires passes to the seller, the seller of the casings not having retained title to them, such being the rule of "accession" which supports the right of the owner of corporeal property, real or personal, to any increase thereof from any cause, either actual or artificial (182 Southwestern Reporter, 576).

IN THE MATTER OF AN APPLICATION FOR THE REVOCATION OF WILLIAM TAYLOR'S PATENT. In 1905 a patent was granted for "An application in golf balls." The specification stated that the principal object of the invention was to obtain better results in the flight of the ball than had been possible with balls of known types. One of the claims was "A golf ball having a spherical surface pitted with isolated cavities, forming the cavities substantially circular in plan, with steep sides and flat or concave bottoms and of a depth not exceeding one-eighth of their diameter." In other claims it was stated that the cavities were to be semi-elliptical in section, the minor axes being radial to the ball, and, also, the cavities were to be of a diameter not less than 9 hundredths, nor greater than 15 hundredths of an inch, and of a depth not exceeding 14 thousands of an inch. The specification stated that preferably the cavities should occupy not less than a quarter, nor more than three quarters of the surface of the ball. On a petition for the revocation of the patent, the petitioners alleged anticipation by certain specifications, prior public use, want of subject matter, and want of utility. At the hearing the holders of patent contended that their experiments, made with a driving machine, showed that the patented golf balls had a better flight than certain balls having a different marking. It was proved that it had long been customary to make indentations in the surface of golf balls to improve the flight, and that at the date of the patent there were golf balls with projections in the form of a segment of a sphere and balls with corresponding depressions, also balls with circular depressions produced by a punch, and balls with raised lines or ridges on their surface. Held at the trial, that the patentee had not shown what particular depth of the depressions or steepness of their sides was the best; that he had not exactly specified the improvement claimed; and that the patent was invalid for want of subject-matter. An order for revocation was made. The respondents to the petition appealed to the Court of Appeal, and this court held, that the patent was invalid for want of novelty and of subject-matter.

The appeal was dismissed with costs (Central Court of Appeal, London, February 1, 1916).

WINS FIGHT OVER TRADE NAME.

The Newark, New Jersey, District Federal Court, on June 8, 1916, filed a decision enjoining the F. W. Devoe-C. T. Reynolds Co. from the use of the word "rubberset" or any other name resembling it. This means that the Rubberset Co., of Newark, has won its second suit in defense of its trade name. To establish the name, the company has spent thousands of dollars annually. The first suit was brought against the Rubber Bound Brush Co., Belleville, New Jersey.

It was decided in favor of the plaintiffs and the decision was later upheld in the Court of Errors.

JAR RINGS IN GERMANY.

Owing to the scarcity of rubber in Germany, and the necessary use of reclaimed rubber, it is now permissible to use compounds containing not over 1 per cent of lead for the manufacture of jar rings for canned fruits, etc. Rubber nipples for nursing children must, however, be lead free.

News of the American Rubber Trade.

OUTING OF THE RUBBER CLUB OF AMERICA, INC.

EXTENSIVE preparations are being made by the committee having in charge the seventeenth annual outing of this club at the Vesper County Club, near Lowell, Massachusetts, on Tuesday, July 18. It is planned to run a special train of sleeping cars, club car and diner from New York, leaving Grand Central Station at 11:30 P. M. on the 17th. Western members will assemble at Cleveland, Ohio, and will travel by special sleeping cars to Springfield, Massachusetts, where they will be joined to the special train from New York. The entire party from New York, Trenton and Akron will thus arrive at the Vesper Country Club by about 8:30 on the morning of the outing. Breakfast will be served on the dining-car on the train. There will also be special cars from Boston to the Vesper Country Club. Similar accommodations will be made for the return of the members to their respective destinations and round-trip tickets will be issued at a special price.

For reservations on these trains, members are requested to make immediate application to P. E. Young, Acushnet Process Co., New Bedford, Massachusetts.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO. ANNUAL MEETING.

The annual meeting of the Westinghouse Electric & Manufacturing Co. was held at East Pittsburgh, Pennsylvania, on June 14. In addition to transaction of purely routine business, the following directors whose terms expired on June 14 were re-elected: J. W. Marsh, G. E. Tripp, H. H. Westinghouse, and A. H. Wiggin. Samuel M. Vauclain, vice-president of the Baldwin Locomotive Works, of Philadelphia, was also elected a director, of the class whose term will expire at the annual meeting to be held in 1919.

The consolidated statement of income gives the gross earnings of the company as $50,269,239.84, and the net manufacturing profit as $9,429,895.76. Other income, with interest deductions, makes the net profit available for dividends and other purposes, $9,666,788.68. The sales billed and net income for the year are in excess of any previous year in the history of the company. These results were attained in part from orders for war munitions, the shipments on account of which amounted to $8,578,266.

WESTERN DIVISION OF THE NATIONAL ASSOCIATION OF WASTE MATERIAL DEALERS MEETS IN CHICAGO.

The western division of the National Association of Waste Material Dealers met at the Sherman House, Chicago, Illinois, on June 13. In his address President Birkenstein urged the members to advance the work of the association by increasing the membership of the western division. The attendance was good and that considerable progress had been made since the last meeting was evident from the favorable reports of the various committees. Among those present were the following: Louis Birkenstein, president of the National association; Harry Birkenstein, Victor Loewenthal and Charles Muehlstein.

SCRAP RUBBER DIVISION MEETING.

The Scrap Rubber Division of the National Association of Waste Material Dealers met at the Hotel Astor, June 21. Chairman Paul Loewenthal presided over the very successful meeting and marked progress was reported since the last meeting. There were about 20 representative members of the trade present who took part in the business of the meeting and the general discussions with enthusiasm. It was decided that the scrap circular B will be revised and issued on July 1 of each year. A committee will be appointed to make recommendations for the necessary changes in the circular. Copies can be obtained from the secretary of the National association.

RUBBER COMPANY DIVIDENDS.

The Apsley Rubber Co. has declared the usual semi-annual dividend of 3½ per cent, payable July 1 to stockholders of record June 16.

The Excello Tire & Rubber Co. has declared a semi-annual dividend of 3½ per cent on preferred stock, payable July 1.

The Kelly-Springfield Tire Co. has declared a quarterly dividend of 1½ per cent on preferred stock, payable July 1 to stockholders of record June 17.

The New Jersey Zinc Co., New York City, has declared an extra dividend of 5 per cent, making six dividends declared so far this year, in all 38 per cent, on the $35,000,000 capital stock. Besides two quarterly dividends of 4 per cent each, the company has paid two extra dividends of 10 per cent and two of 5 per cent each. The six dividends declared this year require payment of $13,300,000 in cash to stockholders. The dividends paid in January and February, however, amounting to 14 per cent, or $4,900,000, were out of profits accumulated prior to January 1, and not out of those of the current year.

The Rubber Goods Manufacturing Co. paid a regular quarterly dividend of 1¾ per cent on the preferred stock on June 15, to stockholders of record June 10.

The Westinghouse Electric & Manufacturing Co. has declared a quarterly dividend of 1¾ per cent on the preferred stock, to be paid July 15, and a dividend of 1½ per cent on the common stock for the quarter ending June 30, to be paid July 31, both dividends payable to stockholders of record June 30.

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on June 24 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois:

	Bid.	Asked.
Ajax Rubber Co. (new)	64	66
Firestone Tire & Rubber Co., common	870	...
Firestone Tire & Rubber Co., preferred	112	114
The B. F. Goodrich Co., common	74¾	74⅞
The B. F. Goodrich Co., preferred	113½	114
Goodyear Tire & Rubber Co., common	233	237
Goodyear Tire & Rubber Co., preferred	106½	107½
Kelly-Springfield Tire Co., common	71	73
Kelly-Springfield Tire Co., 1st preferred	96	96¾
Kelly-Springfield Tire Co., 2nd preferred	...	...
Miller Rubber Co., common	350	357
Miller Rubber Co., preferred	105	106
Portage Rubber Co., common	119	120
Portage Rubber Co., preferred	120	122
Rubber Goods Manufacturing Co., preferred	...	...
Swinehart Tire & Rubber Co.	88	91
United States Rubber Co., common	52¼	53¼
United States Rubber Co., preferred	108½	110

OLDTOWN COMPANY SUCCEEDS XENIA.

The Oldtown Rubber Co., Xenia, Ohio, notice of whose incorporation appears elsewhere in this issue, has taken over the rubber mills, water power, and 23 acres of land of the Xenia Rubber Manufacturing Co., the latter company having ceased operations. The new owners are making extensive alterations of the premises, with the object of greater development of the water power, and modernizing the equipment. The Oldtown company has acquired the patents covering the "Springfield Rubber-Abrasive Polishing Wheels," and will develop this line in conjunction with its extensive manufacture of rubber heels and soles, both for the factory and shoe repairing trade, baby carriage tires, and molded work for mechanical purposes.

MR. SCHLOSSER VICE-PRESIDENT OF THE NATIONAL INDIA RUBBER CO.

AT a meeting of the directors of the National India Rubber Co., Bristol, Rhode Island, last month, George Schlosser was elected vice-president, to fill the vacancy caused by the death of LeBaron C. Colt.

Mr. Schlosser has been connected with the rubber industry more than a third of a century. He entered the employ of the New Jersey Rubber Co. as office boy in 1882. Advanced from one position to another, he was assistant superintendent in 1895, when he was made superintendent of the National India Rubber Co. Six years later he was chosen superintendent of the Alice Mill of the Woonsocket Rubber Co., and still later he was made general superintendent of the Woonsocket Rubber Co. mills at Woonsocket, Rhode Island, and Millville, Massachusetts; the L. Candee & Co. plant at New Haven, Connecticut, and the Lawrence Felting Co. at Millville, Massachusetts.

GEORGE SCHLOSSER.

Mr. Schlosser has had a wide experience in the manufacture, not only of rubber footwear, but also of mechanical rubber goods, and is eminently fitted for the still broader responsibilities which are likely to be added through his recent election.

ARTHUR F. TOWNSEND VOLUNTEERS.

Arthur F. Townsend, president of the Manhattan Rubber Manufacturing Co., has been appointed assistant to Colonel Sternberger, Chief of the Quartermaster's Corps, N. G. N. Y., with the rank of lieutenant-colonel. Colonel Townsend resigned from the position of Chief Quartermaster last January and was placed on the reserve list. His long and varied experience in the National Guard made his services invaluable to the state and he promptly responded to the call.

THE GUNN RUBBER INTERESTS.

The Gunn Rubber Co., whose incorporation is noted elsewhere in this issue, is located at 61 East Main street, New Britain, Connecticut. The officers are as follows: A. P. Gunn, president and treasurer; Edward F. Gunn, vice-president; Albert E. Kilby, secretary.

The president, A. P. Gunn, was also interested in the Todd Rubber Co., of Waterbury, New London, and Pittsfield, Massachusetts, and also the E. J. Todd Rubber Co., Hartford, Connecticut, but has relinquished his holdings in the various companies with the exception of the E. J. Todd Rubber Co., at Hartford, of which he has purchased the entire stock. The new officers of this latter concern are as follows: A. P. Gunn, president and treasurer; M. E. Gunn, vice-president; Edward F. Gunn, secretary. Edward F. Gunn formerly held a one-quarter interest in the Todd Rubber Co., of Pittsfield, and was secretary of that company up to August 31, 1915.

PERSONAL MENTION.

Arthur W. Stedman, whose recent association with the Hagemeyer Trading Co., New York City, as manager of its crude rubber department, was mentioned in THE INDIA RUBBER WORLD last month, sailed for Europe on the "Finland," on June 14. He expects to be away about six or eight weeks.

C. Berlage, rubber and tobacco broker of Amsterdam, Holland, has opened offices at Medan, on the East Coast of Sumatra, and at Soerabaya, Java. With a view of extending his brokerage business and purchasing for American houses, he has arranged with the Hammesfahr Co., 68 Broad street, New York City, to represent him in this country.

W. J. Proctor, general manager of the Dunlop Rubber Co. of Australasia, Limited, Melbourne, Australia, was in this country last month and called on the machinery and supply houses and also visited several tire plants.

W. L. Wadleigh, for many years prominent in the rubber trade in Boston, Massachusetts, and now the head of Wadleigh Co., Limited, Singapore, Straits Settlements, returned from that city early in June, after an absence of nearly seven months, during which he accomplished a most satisfactory amount of business. One of the first things he did upon his return to this country was to go trout fishing in New Hampshire.

H. J. Morehead has been promoted to managership of the New York City branch of The B. F. Goodrich Co., Akron, Ohio. Mr. Morehead has been manager of the Detroit, Michigan, branch since 1908. Paul T. Opper, formerly assistant manager of the Detroit branch, succeeds Mr. Morehead as manager.

The Denver depot of The B. F. Goodrich Co., Akron, Ohio, at 1422-1424 Court place, Denver, Colorado, is now in charge of C. A. Cotter, formerly chief adjuster at the St. Louis, Missouri, branch. H. E. White, whom Mr. Cotter succeeds as manager, has been transferred to a factory position. J. K. Laird, formerly Kansas City adjuster, is the new assistant to the local manager of the Denver depot, and C. L. Harding is new chief clerk.

I. L. Miller, secretary and manager of the foreign department of the Faultless Rubber Co., Ashland, Ohio, has recently returned from a fishing trip in Michigan.

Collier W. Baird, assistant treasurer, Rubber Trading Co., 9-15 Murray street, New York City, is a member of Essex Troop, N. J. N. G., that was ordered to the Mexican border June 26.

M. F. Hall has been placed in charge of the Louisville, Kentucky, depot of The B. F. Goodrich Co., Akron, Ohio, relieving W. H. Sheehy, who will be assigned to other duties.

Wilmer Dunbar will sever his connection with the Greensburg Tire & Rubber Co., Greensburgh, Pennsylvania, July 1.

E. E. Fay, sales manager of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, is at present on a six weeks' trip to the Pacific Coast, visiting the Company's branch offices and distributers in the principal western centers.

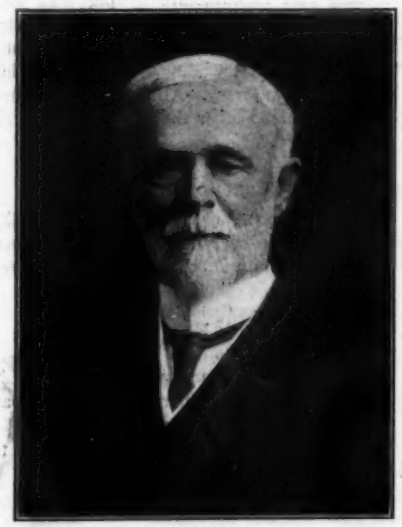
M. H. Whipple, formerly branch manager of the Fisk Rubber Co., Chicopee Falls, Massachusetts, at Fresno, California, is now manager of the San Francisco branch, succeeding E. N. Merguire. R. W. Carter, in charge of the Sacramento branch, goes to Fresno and C. H. Francee assumes charge in Sacramento.

Rubber bands have been put to a new use by the proprietor of a barber shop in a western city, who suspends Japanese fans from the ceiling, over his chairs, by rubber bands. The fans are all kept constantly in motion by the draft from one electric fan at the end of the room. The rubber band gives sufficiently to enable the barber, when he has finished a shave, to use the suspended fan to dry the customer's face.

PRESIDENT ROBINSON OF CANADIAN CONSOLIDATED.

WILLIAM HEZEKIAH ROBINSON, the new president of the Canadian Consolidated Rubber Co., Limited, Montreal, was born in Waterloo, Quebec, Canada, April 17, 1848, and educated at Shefford Academy in that town, Bishops College, Lennoxville, and military schools at Montreal, receiving a first-class certificate in infantry in 1865, and in school gunnery in 1869.

He began business life in a general store in Waterloo in 1867, and in 1870 bought out the business and became head of the firm known as Robinson Brothers & Stevens. He withdrew from that firm in 1874 on account of ill health and two years later entered the service of the Eastern Townships Bank as accountant. Three years later he instituted the branch at Granby of which he became manager, and ten years afterward established the Huntingdon, Quebec, branch which he managed until 1896, when he returned to Granby, where he remained as manager until his retirement from banking in 1908. In the meantime, he went to British Columbia and opened a branch of the bank at Grand Forks. Since 1908 he has devoted his time chiefly to the interests of the Granby Consolidated Mining, Smelting & Power Co., Limited, of which he is vice-president; to the Crow's Nest Pass Coal Co. and the Granby Printing & Publishing Co., Limited, in which companies he has been a director.



W. H. ROBINSON.

He was a director of the Granby Rubber Co., Limited, up to the time of its amalgamation with the Canadian Consolidated Rubber Co., Limited. In 1915 he became a director of the Dominion Rubber System, and on the death of President J. H. McKechnie, was elected to that office.

His military record includes active service during the Fenian raid, when he served as ensign. On the formation of the 79th Battalion, Shefford Highlanders, he was appointed captain and paymaster and later received a commission as major, retiring in 1879.

Mr. Robinson is past master of Shefford Lodge, No. 52, A. F. and A. M. He has three sons, two of whom recently left for the defense of the British nation, one being lieutenant of the 73rd Royal Highlanders, and the other a captain in the C. O. T. C.

TO INVESTIGATE ANTIPODEAN TRADE.

J. A. McKenzie, manager of the Victoria, British Columbia, branch of the Canadian Consolidated Rubber Co., Limited, sailed last month for Australia and New Zealand where he will spend several months in investigating the footwear needs of those islands, with the idea of establishing a district agency there. He expects to spend about seven weeks in Sydney, a month in Melbourne, and a week or two each in Adelaide, Brisbane and New Zealand. While he will devote most of this time in studying the rubber footwear trade, he will look up the tire business to some extent. He will appoint local agents in all important cities in this territory.

TRADE NOTES.

Arthur Jackson Wills, manufacturer of special rubber machinery, North Brookfield, Massachusetts, has applied for a patent on what he terms a "bath cap edging" plaiter which, he claims, produces an absolutely correct plaited edging on either cured or uncured rubber sheet. He has also evolved another machine of the same class which will plat around the edges of disks of pure gum stock.

The Adamson Manufacturing Co., East Palestine, Ohio, is erecting an addition, to be used for the increased production of vulcanizers and new, patented devices of interest to the automobile industry. The building, which will be of brick and glass construction, 50 by 150 feet and three stories high, with a total of 22,500 square feet of floor space, is expected to be ready for occupation some time in July.

The I. T. S. Rubber Co., Elyria, Ohio, manufacturer of cushion heels, is building a brick warehouse to accommodate increased business.

The National Rubber Co., Pottstown, Pennsylvania, is erecting a five-story building, 170 by 134 feet, of reinforced cement and glass construction. This company recently donated a set of tires for the new auto ambulance of the Goodwill Fire Co. at Pottstown.

The Standard Asphalt & Rubber Co., Jersey City, New Jersey, recently qualified to transact business within the State of Oklahoma.

The toy makers of the United States met at the Hotel McAlpin, New York City, June 9, and formed The National Association of Toy Manufacturers. Permanent offices will be opened in this city and a competent secretary engaged to attend to the association's affairs. It is expected the rubber toy manufacturers will become identified with this movement, that will undoubtedly result in benefit to the industry.

The American Hard Rubber Co., New York City, is about to erect at its plant at College Point, Long Island, New York, a three-story building 200 by 50 feet, to be used as a paper box factory and carpenter shop.

The Dayton Rubber Manufacturing Co., Dayton, Ohio, is installing hydraulic vulcanizers and adding to its machinery and mold equipment. The work will be completed within two or three weeks, and will practically double the present capacity of those departments.

The Cameron Machine Co., Brooklyn, New York, was recently favored with an order for ten slitting and rewinding machines from the Russian government. It is understood that these machines will be employed in general commercial work in Russia for converting fabrics, paper and other material into strip for a variety of uses in Russian textile and paper trades, also for medical and surgical purposes.

Following a reorganization of the company, the name of the Dings Electro-Magnetic Separator Co., Milwaukee, Wisconsin, has been changed to the Dings Magnetic Separator Co. The capital stock has been increased from $10,000 to $100,000 and the new officers of the company are: Robert A. Manegold, president and treasurer; Frank W. Manegold, vice-president, and William E. Wehr, secretary. These officers also constitute the board of directors.

The De Vilbiss Manufacturing Co., Toledo, Ohio, has purchased from the Davidson Rubber Co., Boston, Massachusetts, a portion of its hard rubber equipment, which will be transferred to Toledo and will be used in the manufacture of hard rubber parts in connection with the De Vilbiss company's extensive line of atomizers.

TRADE NOTES.

The Rubber Club of America, Inc., was represented in the Cincinnati, Ohio, Preparedness Parade on June 24. Fifty thousand people participated in the parade, and whlie the rubber interest, from a manufacturing standpoint, is not extremely heavy in that city, nevertheless, from the various branches of the trade, 100 men formed a company, and marched, headed by a banner bearing the legend: "Rubber Club of America."

The American Hard Rubber Co., 11 Mercer street, New York City, has built several model four-family apartment houses at College Point, Long Island, New York, for the use of their employes.

Heidman & Haynes, Cuyahoga Falls, Ohio, is a relatively new machinery concern specializing in experimental work for rubber mills.

The United States Rubber Co. of California has opened a factory branch at 906 Sixth street, Sacramento, which will handle all territory to the Oregon line. R. J. Jones, who has been covering this territory for the past five years, will be manager. This store will carry a full line of the United States Rubber Co.'s products.

F. Bierman & Sons Metal & Rubber Co., St. Louis, Missouri, has increased its capital stock from $16,000 to $32,000. This company was formed to deal in all grades of rubber and metals, succeeding the firm of F. Bierman & Son in the same line, and was incorporated under the laws of the State of Missouri in October, 1912. The incorporators are: F. Bierman and two sons, Samuel L. Bierman and Isaac Bierman.

Developments along the Mexican border recently have tested the attitude of employers toward employes who have answered the call to arms. The United States Rubber Co., New York City, of which the United States Tire Co. is an associate, offers full salary and protection of position during absence, the announcement affecting the employes of 37 factories distributed throughout the country and over one hundred branches and stores.

The Fisk Rubber Co., Chicopee Falls, Massachusetts, will hold positions open for employes belonging to the National Guard while they are in service, both at camp and away, for the period of one year. They will pay the married men or single men with dependents three-quarters of their average salary and single men without dependents one-half, and no deductions will be made for the amount received by employes from the government. Should any men now employed desire to enlist, this same rule will apply, with the exception that such employes must have been in the employ of the company for six months prior to this date, this proviso being intended to prevent the employment of men who have in mind enlisting.

BEACON FALLS PLANT AT COLLEGE POINT.

The Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut, has leased 60,000 square feet of factory space at College Point, Long Island, New York, in the one and two-story modern factory buildings at Tenth street, running from Third to Fourth avenues. The College Point plant will be used by the Beacon Falls company as a branch for the manufacture of tennis shoes. Three hundred men and girls will be employed at the start.

LEAD COMPANIES CONSOLIDATE.

The Eagle White Lead Co., Cincinnati, Ohio, and the Picher Lead Co., Joplin, Missouri, have united, and the new company is to be known as the Eagle-Picher Lead Co. with general offices at 208 South La Salle street, Chicago, Illinois.

John B. Swift, who has been president of the Eagle White Lead Co., was elected chairman of the board and chairman of the executive committee. O. S. Picher was elected president and general manager; R. W. Evans, vice-president and general sales manager; S. M. Evans, vice-president; Thomas S. Brown, Jr., treasurer; Joseph Hummel, Jr., secretary. These, with F. L. Perrin, Frederick Hertenstein and J. Edward Webb, comprise the board of directors.

It is announced that the capital stock of the new company has been authorized at $10,000,000, of which $1,000,000 is preferred, $7,000,000 common, outstanding, and $2,000,000 common in the treasury. It is not planned to offer the stock to the public, but employes of the company will be given an opportunity to subscribe to $500,000 worth of the common stock at par, upon easy payment terms.

It is stated that the combined business of the two companies amounts to more than $15,000,000 per year. The new company will engage in the mining and manufacture of pig lead and spelter, all lead products and pigments, plumbers' goods, etc. The company has plants at Henryetta, Oklahoma; Galena, Kansas; Joplin and Webb City, Missouri; Collinsville, Illinois; Cincinnati, Ohio, and Newark, New Jersey. All present branches will be maintained and a number of other district offices opened in the near future.

LOWER PRICES IN ZINC OXIDE.

The New Jersey Zinc Co., New York City, announces the following prices per pound on Florence brand, French process, oxide of zinc, for shipment on contract, during the third three months of 1916:

	Carloads.	Less Carloads.
White Seal	17 cents	17½ cents
Green Seal	16½ cents	16¾ cents
Red Seal	16 cents	16½ cents

The above prices are based upon shipments in barrels f. o. b. shipping point, with freight allowance as heretofore on carload lots only.

The above prices are effective July 1, 1916, and are subject to change without notice.

SOME NEW KETONE SOLVENTS.

One of the interesting developments of industrial chemistry in the past few months is the production of Ketone solvents. These materials are obtained as by-products in the manufacture of a new series of dyes, and are characterized by their exceptional solvent properties. The research department of the Rubber Trade Laboratory, which has succeeded in separating this material into three distinct fractions, thus describes them:

Ketone Solvent No. 1 has a specific gravity of 0.880 to 0.900—and is entirely volatile below 100 degrees C. This solvent will probably be used to a large extent to replace acetone. It has also been tested out in the preparation of cements in the rubber and celluloid industries, and the preliminary experiments indicate that it can be used successfully for this purpose.

Ketone Solvent No. 2 has a specific gravity of 0.900 to 0.950—and has a boiling point of 100 to 150 degrees C. As a solvent, it has been recommended as a substitute for toluol and xylol. These latter materials have a boiling point of 111 and 138 degrees C., respectively.

Ketone Solvent No. 3 has a specific gravity of 0.940 to 0.970—and boils at a temperature between 150 and 180 degrees C. This is a high boiling product, and is likely to find extensive use as an auxiliary material in the manufacture of reclaimed rubber.

A material designated as "Yocarbon" has also been isolated from the melt. This is a pitch-like substance having a melting point of 250 degrees C. and a specific gravity of 1,100.

A means to prevent accidents due to the slipping of belts on pulleys and sudden starting of machines has been devised in the form of a small wooden wedge, covered at its tapered end with sheet rubber. To one side of the wooden strip—which is about a foot long, four inches wide and an inch and a half thick—two clips are attached, and when in use the rubber-covered wedge is inserted between the belt and the pulley, these clips fastening over the edge of the belt and holding it firmly in place.

NEW INCORPORATIONS.

Abdominal Supporter Co., Inc., The, May 29 (New York), $12,000. H. L. Brown, L. A. Hammersley, and Alex H. Sands, Jr.—all of 200 Fifth avenue, New York City. To manufacture elastic appliances, etc.

Acme Rubber Co., March 3 (Ontario), $400,000. F. D. Law, 471 Yonge street, Toronto, Ontario. Principal office, Brampton, Ontario. To manufacture rubber tires, rubber goods, etc.

Aero-Cushion Tire Agency, Inc., April 15 (California), $20,000. W. B. Denhart, J. J. O'Shannessey, and George A. LeDoux—all of San Jose, California. Principal address, San Jose, California. To deal in auto and vehicle tires.

Akron Tire Repair School, May 15 (Ohio), $10,000. A. G. Zeller (president), W. S. Hunter (general manager), C. B. Keener (secretary-treasurer). Principal address, 46-48 North Main street, Akron, Ohio. To teach men the tire repair business.

American Tire Sales Corporation, May 18 (Delaware), $100,000. William F. O'Keefe, George G. Stiegler, E. E. Wright—all of Wilmington, Delaware. Principal address, 901 Market street, Wilmington, Delaware. To manufacture and deal in automobile tires, tubes, etc.

Bolivia-Brazil Rubber & Timber Corporation, February 7 (Arizona), $1,000,000. Hon. Adolfo Ballivian, 2 Stone street, New York City; William L. Glorieux, Jr., Hon. Daniel S. Voorhees, F. B. McMillan, Dr. Britton D. Evans, Samuel T. Busey. To develop rubber plantations, etc.

Chicago Tire Pump Co., May 4 (Illinois), $7,200. George Mahler, Arthur E. Stenzel and Anna Mahler. Principal address, 20 East Jackson Boulevard, Chicago.

City Rubber Corporation, June 10 (Delaware), $550,000. George G. Stiegler, N. T. Parsons, E. E. Wright—all of Wilmington, Delaware. To manufacture and deal in automobile tires, etc.

Crude Rubber Importing Corporation, June 27 (New York), $105,000. S. C. T. Dodd, 37 Wall street, George F. Jebbett, 3161 Broadway—both of New York City, and Tracy S. Buckingham, 204 Livingston street, Brooklyn, N. Y.

Denver Tire Service, Inc., June 9 (New York), $1,000. A. Foshay, 120 Broadway; Russell Goldman, 1190 Madison avenue —both of New York City, and A. G. Thaarnum, 1331 Herschell street, Westchester, New York.

Detroit Tire Co., June 9 (New Jersey), $10,000. Robert S. Mantell, 3,033 W. Grand Boulevard; Ray Wirtz, 1419 Dime Bank Building; J. E. Welch, 944 Woodward avenue—all of Detroit, Michigan. To manufacture, deal in and repair automobile tires, etc.

Druggists Rubber Co., June 17 (Ohio), $10,000. O. D. Eshelman, L. C. Shaver.

Miami Rubber Co., June 17 (Ohio), $40,000. E. H. Botsford, G. C. Congdon.

Gunn Rubber Co., May 21 (Connecticut), $2,500. A. P. Gunn (president and treasurer), Edward F. Gunn (vice-president), and Albert E. Kilby (secretary). Principal address, 61 East Main street, New Britain, Connecticut.

Halifax Rubber Co., May 11 (Pennsylvania), $5,000. John H. Klingman, A. G. Bashoar, of Millersburg, and A. M. Smith, Halifax, Pennsylvania. Principal office at Halifax, Pennsylvania. To manufacture and deal in rubber goods and novelties.

Newmann Rank Tire Co., Inc., May 23 (New York), $25,000. Samuel A. Newman, 316 West 113th street, Ernest Rank, 410 Lenox avenue, and V. C. Bogardus, 140 Nassau street—all of New York City. To manufacture rubber tires, etc.

North American Rubber Co., June 8 (Delaware), $250,000. S. S. Adams, Jr., H. M. Kennedy, M. B. F. Hawkins—all of Wilmington, Delaware. Principal office, Delaware Corporation Co., Tenth and Market streets, Wilmington, Delaware. To manufacture and deal in automobile tires, etc.

Oldtown Rubber Co., The, May 8 (Ohio), $30,000. David Shearman (president), D. A. Bickett (secretary), L. M. Bickett (treasurer). Principal address, Xenia, Ohio. To manufacture rubber heels and soles, and baby carriage tires, etc.

Overtire Service Co., Inc., June 16 (New York), $1,000. Philip Rosenberg, 121 Hopkins street, Isaac Slutsky, 344 Jay street, and Abraham Kempner, 2021 Cropsey avenue—all of Brooklyn, N. Y. To manufacture tires, rubber goods, etc.

Passaic Tire Co., May 31 (New Jersey), $25,000. Hyman Morris and Gussie Morris, 279 Madison street, Yetta Evansky, 56 Lexington avenue—all of Passaic, and Harris Evansky, 799 Paterson avenue, Wallington—both in New Jersey. Principal address, 39 Lexington avenue, Passaic. To manufacture and deal in tires, etc.

Schultz Tire & Supply Co., May 4 (Illinois), $5,000. Frederick C. Schultz, S. H. Schultz, and Emil A. Schultz. Principal address, 6737 Sheridan Road, Chicago. To deal in tires and supplies, also have a complete vulcanizing plant and service station.

Reliable Tire & Rubber Co., of New England, June 6 (Massachusetts), $25,000. Joseph T. Gilman, 9 Lawson road, Winchester; G. S. Van Voorhis, 440 Newbury street, Boston; Hermon Holt, Jr., 45 Pleasant street, Newton Center—all in Massachusetts. Principal address, Boston, Mass. To deal in tires, etc.

Sanitary Rubber Tooth Brush Co., June 10 (Delaware), $100,000. Frank L. Mettler, Charles F. Bowers, Moses Weil—all of Wilmington, Delaware. To manufacture tooth brushes of all kinds.

Supreme Rubber Co., June 17 (Ohio), $25,000. Chester A. Teits, Dan Zeisloft and others.

Wright Tire & Rubber Co., May 20 (Ohio), $100,000. Richard Ryan, Robert Wright, C. R. Wagner, C. F. Hiller and A. C. Foose. Principal office, 2041 E. 105th street, Cleveland, Ohio. To manufacture rubber goods in general and the Wright Anti-Skid Puncture Proof Pneumatic tires in particular, together with a demountable rim.

Westgard Tire & Rubber Co., June 20 (Delaware), $1,500,000. A. L. Westgard, 18 Old Slip; J. E. Levi, 50 Broad street and R. S. Ireland, Fifty-first street and Broadway—all of New York City. Principal address, 202 Equitable Building, Wilmington, Delaware. To manufacture rubber, rubber tires, rubber goods, etc.

Western Tire & Garage Co., January 27 (New Mexico), $1,000,000. J. D. Hamlin (president), C. A. Roberson (vice-president), M. M. Craig (secretary), C. L. McClellan (second vice-president), J. A. Oden (treasurer). Principal office, Texico, New Mexico. To manufacture and deal in automobile tires.

Wakefield Motor Reconstruction Co., June 1 (Massachusetts), $25,000. Thomas E. Dwyer, 12 Gould street; John D. Dwyer and Dennis F. Dwyer, 228 Spring street—all of Medford, Massachusetts. Principal office, Wakefield, Massachusetts. To manufacture and deal in automobile tires, etc.

LATE CUSTOMS RULING.

It seems that rubber bulbs are not druggists' sundries if they are made to be used on pyrographic outfits. This was the decision of Judge McClelland, reversing the action of the collector in assessing a 15 per cent duty as "rubber manufactures commonly known as druggists' sundries," and sustaining the claim of the importers for entry at 10 per cent as "manufactures of rubber not specially provided for."

AMERICAN INVESTMENTS IN MEXICO.

Marion Letcher, United States consul at Chihuahua, states that up to 1912, American investments in Mexico aggregated $1,057,770,000. He credits $15,000,000 of that amount to American capital invested in the rubber industry.

A MODEL TIRE PLANT OFFICE.

The Colorado Tire & Rubber Co., Denver, Colorado, has just completed plans, and will soon start building an addition to its present plant, at a cost of about $12,000. This addition will be two stories high, of brick, as is the present factory. The enlargement is necessitated because of the heavy increase in demand for the company's "Durable" treads. The accompanying

picture shows the business office of the company, which, for systematic arrangement, and for the comfort and convenience of the workers, is worthy of study of details by every concern having a large office force. Such an office must naturally facilitate routine work and make for increased efficiency.

NEW PLANT FOR GOODYEAR IN TORONTO.

The new plant of the Goodyear Tire & Rubber Co., Limited, in New Toronto, Canada, mentioned in a former issue, will comprise a building for the manufacture of pneumatic tires, 100 by 560 feet, four stories and basement; a power plant, and a building for the manufacture of cement. C. H. Carlisle is treasurer and general manager. The present factory of this company is located at Bowmanville, Ontario, and when the new plant is completed the Bowmanville factory will be used exclusively for the manufacture of mechanical goods, carriage tires, motor truck tires and Neolin.

A NEW TIRE FACTORY AT SOUTH BEND.

The International India Rubber Corporation, incorporated under the laws of Delaware, October 29, 1915, with a capital stock of $1,000,000, is to build a factory at South Bend, Indiana, for the manufacture of automobile tires and tubes and other rubber products.

The officers and directors are: Peter E. Studebaker, president; Edward H. Schwab, vice-president; Thomas W. Slick, treasurer; George W. Odell, secretary and general manager; William S. Moore, director.

Mr. Studebaker is the son of Henry Studebaker, who founded the Studebaker Brothers Wagon Co. in 1852. As soon as the plant is in operation, he will devote his entire time to the interests of the company.

Mr. Schwab is a manufacturer of spark plugs at Bethlehem, Pennsylvania, and is a brother of Charles M. Schwab, former president of the United States Steel Co.

Mr. Slick is a lawyer and was formerly president of the Chapin State Bank and director of the American Trust Co. and the Union Trust Co., and is interested heavily in real estate in South Bend, Elkhart and Gary.

Distributing branches are being established in various parts of the country by selling garage men and tire handlers small blocks of 7 per cent cumulative preferred stock.

NEW FIRESTONE BRANCHES.

A three-story building in Los Angeles, California, is soon to be erected by the Firestone Tire & Rubber Co., Akron, Ohio, to be used as a tire branch. An unusually attractive establishment is planned for this branch, the construction to be of the characteristic California mission style.

A new two-story structure is about to be started at Syracuse, New York, which will be used as a tire building for the Firestone company.

A branch has also been opened at Harrisburg, Pennsylvania, in a temporary location, and it is expected that a permanent location will soon be secured. L. L. McClintock is in charge of this branch.

A new direct factory branch at Springfield, Massachusetts, covers a space of 48 feet frontage and 32 feet depth, containing two private offices, one for use by the adjusters, and the other being the office of the branch manager, G. I. Engle. Equipped with a Syracuse press, and facilities to take care of all trucks, this branch will also carry a good supply of motor truck tires, pneumatic tires, bicycle tires, accessories, repair stock, rims and carriage tires. The territory embraces the State of Vermont; Cheshire and Sullivan counties in New Hampshire; and Berkshire, Hampden, Hampshire and Franklin counties in Massachusetts.

THE BRUNSWICKE-BALKE-COLLENDER CO.

The Brunswicke-Balke-Collender Co., Chicago, Illinois, maker of billiard tables, bowling alleys, etc., has entered the tire manufacturing field, and will manufacture automobile tires and inner tubes as side lines at its factory at Muskegon, Michigan. This company has also begun the manufacture of electric storage battery cells and other specialties in both hard and soft rubber.

HELPING THE CAUSE OF PREPAREDNESS.

The Norwalk Tire & Rubber Co., Norwalk, Connecticut, has offered to pay every factory employe who joins the training camp at Plattsburg this summer the difference between the wage he earns at camp and his regular wages, thus allowing every employe who goes to the Plattsburg camp to receive full pay. This is an especially generous concession in view of the fact that the rush of orders at the Norwalk company's factory is necessitating night and day work.

WILL BE RUNNING NEXT MONTH.

The plant of the Hawkeye Tire Co., Des Moines, Iowa, whose incorporation was noted in the June issue of THE INDIA RUBBER WORLD, embraces about 40,000 square feet of floor space. The

company expects to be turning out 100 tires per day by August 1, the maximum capacity being 400 tires per day. E. E. Harding, formerly of the Swinehart Tire & Rubber Co., and of the Knight Tire & Rubber Co., will be assistant general manager.

COMFORT AND BUSINESS.

Down in the busy business district of New York City one hardly expects to find such a home-like office as that occupied by R. J. Caldwell, of the company which bears his name, situated at 15 Park Row, corner of Broadway. Mr. Caldwell con-

trols the output of two large tire and mechanical fabric mills and is an important distributer of this product to the rubber trade. His office looks more like a library in a private residence, and shows evidence of the best of taste in furnishings. Mr. Caldwell believes that in these surroundings he is able to do more and better work than in the old-fashioned business office, and it certainly gives the visitor, whether calling on business or socially, a most home-like feeling which, in itself, is a welcome second only to Mr. Caldwell's own cordial greetings.

GOODRICH SERVICE STATIONS.

Recognizing the importance of Bangor, as a distributing center to the automobile tire and accessory trade, The B. F. Goodrich Co., Akron, Ohio, has opened a wholesale stock depot and dealers' service station at 7 Franklin street, Bangor, Maine. H. H. Baker will be in charge.

During the past month the Goodrich company has also established a similar station at 137 St. Paul street, Burlington, Vermont, under the management of L. E. Stone, and one at 243 North Sante Fe avenue, Salina, Kansas, in charge of L. K. Graham.

INSTALLS A RESEARCH DEPARTMENT.

The Polack Tyre & Rubber Co. is operating its factory at Bridgeport, Connecticut, on a 24-hour schedule. This company has recently added to its organization a scientific development department including a laboratory for routine testing and research work. This department is in charge of Webster Norris, one of the best known American rubber chemists.

BeSAW TIRE & RUBBER CO. SUCCEEDS QUALITY.

The Quality Tire & Rubber Co., Hartville, Ohio, has changed its name to the BeSaw Tire & Rubber Co. Charles BeSaw, the president and general manager, was formerly general superintendent of the Knight Tire & Rubber Co., of Canton, Ohio, and P. P. Parker, the sales manager, was formerly assistant sales manager for the latter concern. The BeSaw company is working its plant both day and night and turning out about 150 tires daily, one a high grade known as the "BeSaw Quality," and a low-priced tire in small sizes which has been named the "Blackford."

TRADE NOTES.

The following new agencies are reported by the Braender Rubber & Tire Co., Rutherford, New Jersey, manufacturer of Braender tires and tubes: American Motor & Equipment Co., 181 Massachusetts avenue, Boston, Massachusetts; The Kassler Motor Co., 5th and White streets, Dubuque, Iowa, and H. B. Herr, 30 West King street, Lancaster, Pennsylvania.

The capital stock of the Fisk Rubber Co., Chicopee Falls, Massachusetts, has been increased from $14,400,000 to $19,400,000.

The Kansas City Tire & Rubber Corporation, manufacturer of pneumatic and solid tires and tubes, was incorporated under the laws of New York, May 21, 1915, with a capital stock of $575,000. The principal office of the company and one of its factories are in Kansas City, Kansas, another factory being located at Chester, West Virginia.

The Quaker City Rubber Co., Philadelphia, Pennsylvania, is building a one-story addition, 50 by 150 feet, to afford better facilities for handling its output of tires.

The Ajax Rubber Co., Inc., New York City, which distributed prizes for high mileage of its tires for the year ending March 31, 1916, is now offering $5,000 in cash prizes in a similar contest now begun, and to continue until March 31, 1917. Two hundred and eight cash prizes are offered to chauffeurs. The judges of the contest are as follows: Alfred Reeves, general manager, National Automobile Chamber of Commerce; R. A. Patteson, president, Tarrytown (New York) National Bank; L. W. Scudder, certified public accountant, New York City.

The Keystone Tire & Rubber Co., New York City, has increased its capital from $5,000 to $500,000.

F. A. Skipworth, of Dallas, Texas, will handle the products of the Wilson Tire & Rubber Co., Springfield, Illinois, in the State of Texas. This is not a factory branch, as Mr. Skipworth is using his own capital.

The Boss Rubber Co., a tire distributing concern with headquarters in Denver, Colorado, has very recently opened a new store at Butte, Montana, which will be the distributing point for the state. The company is said to specialize in Kelly-Springfield tires.

The plant of the Beaver Tire & Rubber Co., Ashtabula, Ohio, is rapidly being pushed to completion. The company hopes to be on an operating basis shortly after August 1.

With a view to organizing the rubber industry of Los Angeles, California, as a unit in the chain of similar organizations throughout the United States to be affiliated with The Rubber Club of America, Inc., 15 leading members of the tire trade of that city recently met at luncheon for discussion of the plan.

Contracts for three new buildings will be given out by the Federal Rubber Co. of Cudahy, Wisconsin. When these are completed the company will have approximately 12 acres of floor space, and will allow facilities for a 50 per cent increase in the output of Federal products. The company is putting out a new line of black tread tires under the name "Traffik," made in non-skid and plain types.

The Valley Rubber Co., North Yakima, Washington, has recently installed a new 6-bar tube press, which greatly facilitates the treatment of inner tubes and saves delay on repair work.

Aeroplane cord tires, made with large cross sections to afford adequate cushioning properties, will probably be extensively used on American air craft in the future.

THE GOODWEAR TIRE CO. BUILDS.

The Goodwear Tire Co., Minneapolis, Minnesota, incorporated January 6, 1916, with a capital stock of $300,000, is building a factory at Red Wing, Minnesota, 120 by 150 feet, two-story and basement, and a power plant, 60 by 50 feet. The plant will be equipped with the most up-to-date machinery obtainable and the company expects to begin operations by November with a production of 200 tires and tubes daily and a full mechanical line. The officers and directors are as follows: H. Scott Ewers, president; G. W. Franson, vice-president; Frank E. Oberg, secretary; C. W. Oberg, treasurer; Harry J. Smith, purchasing agent and factory manager.

ARMORED CAR FOR THE MARYLAND NATIONAL GUARD.

Rubber men all over the country are interesting themselves in the present Preparedness movement. The Maryland National Guard will have a first class armored car of the latest approved type if the plans of four Baltimore men prove successful. They are at this time endeavoring to raise the necessary funds through subscription, and a good start had already been made the latter part of June. At the head of the committee is George P. Thomas, 3d., of the Goodyear's Rubber House, Baltimroe, of which his father, George P. Thomas, Jr., is principal. The other members of the committee are Addison de Goll, E. L. Bartlett, 3d., and Gordon T. Parks, the latter being treasurer.

THE NEW DREADNAUGHT COMPANY.

The Dreadnaught Tire and Rubber Co. of Maryland, incorporated under the laws of Maryland, has purchased the entire plant and assets of the old Dreadnaught Tire and Rubber Co. of Delaware, the new organization being completed and the plant at Orangeville, Maryland, ready to commence operations July 1. The general offices of the company are also located at the Orangeville plant.

The new company is capitalized at $700,000, of which $300,000 is preferred and $400,000 common; nearly one-half has already been subscribed to. The officers are as follows: John Hiltz, president; John P. Lauber, vice-president; Wm. C. Schmeisser, treasurer; H. James Lepper, secretary, and W. V. Sleek, general manager. All of these men, with the exception of Mr. Sleek, are well-known Baltimore business men. Mr. Sleek has for the past four years been connected with the Mansfield Tire & Rubber Co., Mansfield, Ohio, as purchasing agent and efficiency engineer and for ten years previous, in executive capacities, with some of the largest motor car manufacturers.

CRUSADE AGAINST FRAUDULENT TIRE AND SUPPLY SCHEMES.

The American Automobile Association is conducting through its legislative committee a campaign against fraudulent schemes in the accessories field. Richard H. Lee, of Cleveland, Ohio, the chairman of this committee, is president of the Cleveland Automobile Association and the Ohio State Automobile Association. This crusade is directed against leagues and associations which promise standard automobile supplies and accessories at cut rates. Through the efforts of this committee two men pleaded guilty to fraud in St. Johns, New Brunswick, Canada; one man was arrested in Uniontown, Pennsylvania, and pleaded guilty to fraud; and a fourth was arrested in Valdosta, Georgia; and in Washington on June 24, the president of the International Automobile League was arrested at the close of his testimony before the solicitor-general of the Post Office Department, on an action brought to prevent the use of the mails by the league, which purports to supply its members with tires and auto accessories at greatly reduced prices to those who pay an annual fee of $10 to join the organization. But it is claimed that members, who wrote for standard accessories and tires listed in the catalog, have been informed that they were "just out," and have been offered unnamed tires "manufactured by the concern exclusively" instead of those cataloged. When complaints were made, it was pointed out that the contract with members provided that they would furnish the goods listed in the catalog, "when such goods are in stock." The legislative committee is to be congratulated on this outcome of its activities.

TIRES AT THE INDIANAPOLIS AUTOMOBILE SWEEPSTAKES.

The first three cars in the 300-mile automobile sweepstakes race at Indianapolis, May 30, were equipped with Goodrich Silvertown cord tires. The fourth and fifth cars used Firestone tires.

The leaders using the Silvertown tires covered the 300 miles with but one change each, while the Firestone tires completed the distance with four changes. Left front tires were unchanged, but several right front tires were blown, this tire being most dangerous of all and requiring most careful attention. Generally speaking, the tire changes were made often to insure safety. Tires were inflated to about 60 pounds, although some drivers inflated to 100 pounds, and then, before starting, let the pressure down to the required amount.

Many drivers used smaller tires in front than in rear on account of the strength required in steering with 5-inch tires.

One driver used a novel attachment for cooling his tires. Water was conducted from a special tank by pipes to each wheel, ending in spray nozzles. The apparatus worked by air pressure, the control-valve being operated by the mechanic.

T. G. RICHARDS BUYS THE B. & R. RUBBER CO. PLANT.

The plant of the B. & R. Rubber Co., North Brookfield, Massachusetts, which has been in the hands of the receivers, was advertised to be sold at public auction as a going concern in one lot, at a price of not less than $265,000. The sale was to be on June 28, at the office on the premises, but was, on that date, postponed till June 29, when it was sold to Thomas G. Richards, who was president and treasurer of the B. & R. Rubber Co. According to the terms of the sale, the property is to be delivered within 15 days from the confirmation of the sale by the court.

A FIREMAN IN HIS YELLOW SLICKER.

A fire chief in one of the Southern cities recently took a newspaper man into his confidence relative to the yellow oil coats known as "slickers." When he joined the fire department his first act was to possess himself of one of these coats. Shortly after an alarm was sent in. The rest of the story can very properly be told in his own words:

"My, that was a hot fire! But when we got there it was supposed to be my job to be on the business end of the steamer line. I had on my pretty little yellow slicker and was a fit subject for a swell drawing room, and started with the captain of the company for the fire. By the time I got half way across the street that coat began to melt from the heat of the fire, and the *liquid rubber* began to run down my neck, raising a blister wherever it touched my then tender hide. I began to try to squirm out of it, and one of the boys pulling slack behind me thought I was trying to pull it further up on me, and he came to help. Great Caesar, the very thing I didn't want done was being done. I suppose we have all formed an idea of the inferno. I had mine before that, but let me tell you one thing, and you can take my word for it—my idea of the inferno before that man pulled that coat up on my neck and back would make the warm place an ice palace beside the new idea I formed from that experience.

"Yes, sir; I am 'agin' *rubber coats* to fight fire in and have been from that night."

This is an interesting story, and nobody can blame the chief for looking with marked disfavor on the yellow "slicker," but his description of it as a "rubber" coat is quite inaccurate, because there is no rubber in these yellow coats—they are waterproofed with boiled linseed oil, and,—are they ever worn by firemen?

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

THE rubber companies of this city are responding generously to the call of patriotism in encouraging their employes to join the militia for Mexican service, by the practical expedient of insuring them against financial loss.

The B. F. Goodrich Co. has announced that to all employes who will serve in the militia who contribute to the support of dependents, two-thirds of their average wage, based on their previous average wage during the last three months, will be paid.

To all men not contributing regularly to dependents, one-half of their average wage will be paid.

Payment will be made direct to dependents designated or will be held in trust for the employe. Insurance issued by the company will remain in effect. The company also announces no discrimination will be made against the employe upon his return and he will return to his position if possible.

The Goodyear Tire & Rubber Co. encourages its employes to enlist in the national guard, allowing them the necessary time for summer military camp duty, without prejudicing their salaries or positions with the company. Many Goodyearites are affected by the President's mobilization order, among whom are executives and engineering experts whose services to the company are invaluable.

The Firestone Tire & Rubber Co. will give all employes enlisted on or prior to June 20, who have been in continuous service of the company three or more years, full wages less all money received from the State or National Government. Employes in continuous service of the company between one and three years, will receive two-thirds of wages less all money received from the State or National Government; and employes in continuous service of the company less than one year, one-half of wages less all money received from the State or National Government.

Employes who enlist after June 20, will be allowed wages as follows, less all money received from the State or National Government:

Those in continuous service of the company three or more years, full wages; those in continuous service between one and three years, two-thirds of wages; those in continuous service between six months and one year, one-half of wages. Those in continuous service less than six months will receive no allowance. The average wages earned per month for three months prior to enlistment will be the amount allowed piece workers, also employes on salary.

* * *

The Firestone Tire & Rubber Co. has just installed a turbine engine, capable of generating 12,000 horsepower. The new turbine replaces one of 3,000 horsepower.

That there is a growing interest in the popular mind as regards the rubber business is shown by the inquiries made to every rubber company for samples and particulars of manufacture by school principals and teachers. To meet this demand, the Firestone company has prepared an exhibit of the chief commercial rubbers and has sent out several hundred such exhibits to the various schools and colleges, together with a booklet which explains processes of manufacturing the various articles.

On June 17, the power house of the Firestone company was partially destroyed by fire, caused by defective insulation. While the fire was confined to the power plant, the damage done was of a character to affect general operation, though all departments are now restored to normal operating condition.

A. H. Harris has sold to the Firestone company his patents on the machine and method used in making cord tires. This machine was illustrated and described in THE INDIA RUBBER WORLD, January 1, 1916.

Mention was made in the June letter of the appointment of a meeting of stockholders to increase the capital stock of the Miller Rubber Co. and to distribute shares to the common stockholders. The meeting was duly held on June 2 and the capital stock of the company was increased from $2,000,000 to $20,000,000, divided into 200,000 shares of $100 each, of which amount of stock $10,500,000 par value, consisting of 105,000 shares of $100 each, shall be preferred stock, and $9,500,000, consisting of 95,000 shares of $100 each, shall be common stock.

The Miller company is to be congratulated on the present condition of its business. It is stated that for the past six months of the present fiscal year the sales were 100 per cent in excess of the same period last year. The gross sales from October 2, 1915, to April 1, 1916, were about $2,000,000, compared with $800,000 for the same period the previous year. A portion of the proceeds of the sale of $2,500,000 worth of preferred stock is to provide for factory additions now in process of erection and for the retirement of old preferred stock. The company is erecting two six-story buildings and two eight-story buildings which, when completed, will make the total floor area over 21 acres.

The advertising department of the Miller company is sending to dealers handling its tires electrotype advertisements for inserting in the local papers which are distinctly novel. Each one is adorned with a figure named "Mr. Quick Service," the word "Quick" being used to form the principal features of this suppositious person. He is crowned by a cap made from a Miller tire and he is represented as being on the spot to do every sort of tire and tube repairing. The ingenious artist has evolved a figure which is decidedly noticeable, though it can hardly be called handsome, but that it will be quickly recognized if given sufficient publicity goes without saying.

* * *

At a director's meeting of the Portage Rubber Co., at Barberton, held on May 29, the regular quarterly dividend of 1¼ per cent upon its issued and outstanding preferred capital stock was declared, payable July 1 to stockholders of record June 20; also a quarterly dividend of 2 per cent on its issued and outstanding common stock, payable August 15 to common stockholders of record August 5.

The Portage company will hold a stockholders' meeting on July 11 to vote on a plan to increase the capital stock of the company from $1,250,000 to $3,000,000. Half the new stock is to be common, and shareholders will be offered the right to buy new stock at 105. The issue has already been underwritten.

* * *

The Punctureless Auto Tire Co., manufacturer of the King tubeless truck tire, has recently purchased a 20-acre tract of land just south of the Barberton pumping station, with a frontage of 1,864 feet on the Pennsylvania, Erie and B. & O. tracks on the north; Mud Run on the east; the Ohio canal on the south, and 364 feet of public highway. A factory will be built at once, comprising four main buildings, 80 by 400 feet, four stories high, with a power and rim plant. A temporary building will be erected for immediate production.

* * *

The Double Service Tire & Rubber Co. has purchased the plant of the Lily Rubber Co. at Barberton, comprising 4½ acres of ground. For the present, the buildings now on the property will be used, but a new, modern tire factory will be erected in the near future on this site.

* * *

The Goodyear Tire & Rubber Co. recently presented to the Ohio National Guard, through Battery B, largely composed of Goodyear employes, a fully equipped military "kite" balloon, made under the direction of Sergeant R. H. Upson, the Goodyear aeronautical expert.

The kite balloon is a type of balloon developed by foreign governments for use in making military observations. It takes its name from the manner of rigging, which is similar to a

boy's kite, being held at an angle from horizontal so that the wind helps to hold it steadily in suspension. Experiments at the Goodyear Tire & Rubber Co. factory have developed a balloon which it is claimed can be operated in any weather conditions, and will not pitch, roll nor yaw even in a stiff gale. The new balloon is 81 feet long and 22 feet in its largest diameter. Hydrogen gas is used for inflating. The method of rigging is readily shown in the picture, taken during the test

last month which was conducted under the observation of representatives from two foreign governments, and one each from the United States Army and Navy, and pronounced satisfactory.

The use of an automobile for holding the balloon was a novel proceeding. The "kite string" was a wire cable. This was passed over a drum, and power was transmitted to the drum from the driving wheel of the automobile, thus allowing the balloon to be raised or lowered as desired, an experiment found to be fully successful.

It is claimed that in 1907 the Goodyear Tire & Rubber Co. made 28,685 tires; that this year it will make more than 3,000,000, and that in 1917 the output of Goodyear tires will exceed 5,000,000.

To make a larger area available as a site for the Goodyear company's new mechanical goods and chemical plants, a new channel is being excavated for the Little Cuyahoga River, incidentally shortening its course.

The third smoke-stack of the Goodyear company, which was recently completed, is the highest in the State, and required 1,585 tons of brick in its construction. It is 21 feet 6 inches in diameter at the top, which is 250 feet above floor level. On June 22, the Goodyear company set a new record in tire production by turning out in 24 hours 28,499 tires.

* * *

A delegation of the American Association of Chemical Engineers recently were shown through the factory of The B. F. Goodrich Co., and subsequently entertained at luncheon at the Portage Country Club, Akron, Ohio.

* * *

Garth A. Dodge, one of the well-known rubber engineers of Akron, and a member of the American Society of Automobile Engineers, has recently accepted the position of factory manager and mechanical engineer with The Dayton Rubber Manufacturing Co., Dayton, Ohio.

A. J. Bethea, a chemist of experience schooled in the Akron plants, has also joined the staff of the Dayton company.

* * *

Among the recent visitors to Akron well known in rubber and allied lines were: William D. Anderson, Bibb Manufacturing Co., Macon, Georgia; R. P. M. Eagles, Taylor Armitage & Co., New York City; F. H. Peaty, H. A. Astlett & Co., New York City; Merton A. Turner, Monatiquot Rubber Works Co., South Braintree, Massachusetts, and Thomas Midgley, The Interlock Core Co., Columbus, Ohio.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

REGARDING the rubber trade generally, I find no one complaining very greatly of dull times. To be sure, some lines are in more demand than others, but all are having a pretty fair call. Manufacturers of automobile tires report a better call than last month, and this is but natural, for as the season proceeds more machines are going into use, and those already in use are wearing out tires, thus there is both a manufacturer's and a consumer's demand. This has been a record season in rubber footwear and the demand for tennis goods has been wonderfully expanded. Just now jobbers are sending in additional and duplicate orders for rubber footwear, the time limit for the extra discount allowed by some companies expiring July 1. In mechanicals the call continues to increase for belting, this because of the continued high price of leather. But this is to some extent balanced by the small demand on the manufacturers for garden hose, owing in great measure to the backward spring and the large amount of rain which has fallen during the last two months. The rubber clothing business, in the retail trade, at least, has been exceptionally good, owing to the aforesaid rainy weather. Manufacturers have more orders for waterproofed garments than they have ever had at this time, and some are making preparations to increase their output. Taken altogether, the rubber trade in this section is in a most satisfactory condition.

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Like all other sections of the country, the Massachusetts militia responded quickly to the call of the President and at this writing are already on their way to the Texas border. And here, in the emergency, the Forsyth Dental Infirmary for Children offered its services to treat free the dental needs of those who were going into military service. The infirmary, which was intended for free service for children only, was enabled in the short time between the call to arms and the departure of the troops, to give several hundred treatments, the 65 chairs being continuously occupied during Saturday and Sunday, June 24 and 25, and even a portion of Monday, the day when the companies departed for the South. Here is another example of the public benefaction of the president of the Boston Belting Co., and as a side thought, a tribute to his ingenuity, for it was through his insistence, and his own suggestions and designs, that the chairs in the infirmary, though made primarily to accommodate children, were so adjustable that they could be used, while being treated, by the troopers of all dimensions and weights. Adjutant-General Cole and Mayor Curley have both sent their thanks to Thomas A. Forsyth and Superintendent Dr. W. H. D. Cross for this timely assistance. And it might be added that Dr. George A. Sullivan, of the Carney Hospital Clinic, and 20 dental assistants went immediately to Camp Whitney to do similar work for other soldiers there.

* * *

The Pennsylvania Rubber Co.'s Boston store has been moved from Boylston street to the new Lewis building at 683 Beacon street. This move is an important one, as it brings the company's headquarters right into the heart of Boston's automobile district, which will undoubtedly redound to the material benefit of the sale of the Pennsylvania company's well-known tires.

The Davidson Rubber Co. has recently sold to the De Vilbiss Manufacturing Co., Toledo, Ohio, a portion of its hard rubber equipment, and it was reported that the Davidson company was about to retire from hard rubber manufacture and use the space formerly devoted to this branch for the development of soft rubber specialties. I am in a position to contradict this story. The only equipment which the Davidson company has sold is that pertaining to the manufacture of hard rubber parts for atomizers. Aside from that, the Davidson company's hard rubber department will continue as usual.

* * *

Mention was made in my letter last month of the completion of new buildings of the Boston Woven Hose & Rubber Co., and I am sending you a photograph of one of the new buildings in order to show their character and stability. This is the smaller of the recently added buildings, measuring 155 by 60 feet. Like

the others, it is of reinforced concrete construction. This structure will be used mainly for storage purposes, although one floor will be devoted to the comfort and convenience of the employes during their noon hour, tables being provided for those who bring their lunch, while a lunch counter will be established where food will be furnished practically at cost. There will be facilities also for entertainment, thus adding to the welfare work already established by the company. A similar building just completed is used for a machine shop, the manufacture of garden hose, and for storage. This is also 60 feet wide and more than 200 feet long, and is provided with a traveling crane in the center bay which extends the full length of the building. The company has just broken ground for another building, 165 by 60 feet, four stories, also of this same solid concrete construction, which building will be used to extend the manufacture of friction tape, rubberized fabrics, etc.

* * *

The strike at the Revere Rubber Co. factory at Chelsea has now lasted a month, with prospects of a long continuance. The strikers demand a nine-hour day and 50 hours a week for men, and a 48-hour week for women, as well as an increase on piecework basis. At a conference between the strike committee and Superintendent Scribner on the 19th of June no agreement was reached. In an interview, Mr. Scribner said he has only the kindliest feeling for the men, that he regrets the continuance of the strike, but sees no prospect of an early settlement.

* * *

The Standard Woven Fabric Co., manufacturer of "Multibestos" products and rubber specialties, is installing new equipment and making important changes in the plant at Walpole which it recently purchased. This will give the company a much needed addition to its present facilities for the manufacture of clutch linings which is now being carried on at the plant at Framingham. The business of this company has been so important and so pressing as to necessitate working upon a day and night schedule, but it is hoped that as soon as enough machinery is installed at Walpole, it will be possible to discontinue production at Framingham, and to move the whole equipment from there to the newly acquired property at Walpole. In this connection the company will develop a business in friction and insulating tapes for the electrical trade, the Walpole property being particularly adapted for this line of manufacture. The company has closed a contract to manufacture rubber heels for the Panther Rubber Co., Stoughton. It is reported that the contract calls for a maximum output of 100 gross per day, and the company has already started on this work.

* * *

Everett Morss, president of the Simplex Wire & Cable Co., of this city, which has had a successful profit-sharing plan in operation for 15 years, is scheduled to speak at the Third Annual Babson Conference on Coöperation at Wellesley Hills, Massachusetts, in September. Vice-Chairman Edward N. Hurley, of the Federal Trade Commission, has also accepted an invitation to speak, and others who are interested in profit-sharing are expected. Mr. Morss's address last year excited keen interest on account of the simplicity and directness of his ideas on profit-sharing.

* * *

The F. S. Carr Co., of this city, has removed its Canadian factory from Tilbury, Ontario, to Granby, Quebec, where it has bought the premises formerly occupied by the Walpole Rubber Co. This is a five-story brick main factory and a brick cement mixing building, and is in every respect an up-to-date establishment. The Carr company will manufacture a line of rubber heels and shoe factory supplies, automobile fabrics, rubber sheetings and hospital supplies. This, of course, is an auxiliary factory for supplying Canadian trade. No change will be made in the Framingham, Massachusetts, plant. The Canadian factory is in charge of P. G. Dunham, who went to Granby seven years ago, and organized and managed the Walpole company's factory there, and later assumed the supervision of the Walpole, Massachusetts, plant, resigning two years ago to take charge of the Carr company's Canadian business.

* * *

The new mill of the American Tire Fabric Co.'s plant in Newburyport is now nearly completed and equipment is soon to be installed. It is a brick structure, 186 feet long and from 20 to 64 feet wide. This concern is a successor to the American Textilose Co. It is expected to give employment to about 80 hands at the start.

* * *

At the National Shoe and Leather Market-Fair, which is to be held in this city the week of July 12 to 19, the following manufacturers will exhibit: Panther Rubber Co., Essex Rubber Co., Federal Rubber Co., The B. F. Goodrich Co., Avon Sole Co., Revere Rubber Co., Goodyear Tire & Rubber Co. All of these are manufacturers of rubber soles and heels, but only one manufactures boots and shoes. This might seem strange at first thought, but practically the season's business in rubber footwear has already been placed and this may be the reason why none of the other rubber boot and shoe manufacturers have thought it expedient to make exhibits.

* * *

Hudson, Massachusetts, holds its fiftieth anniversary of incorporation as a town the second, third and fourth of this month and there will be a general celebration appropriate to the Fourth of July, and also an industrial exhibit at the Armory, of goods manufactured in Hudson. The Apsley Rubber Co. will show a full line of all its different styles of goods, and will have in operation machinery for manufacturing. Operatives will show the making of boots and shoes and rubber clothing. Hudson was named for the only member of Congress elected from that place previous to its date of incorporation and the only other member of Congress from that town is the Hon L. D. Apsley, who will deliver an address on this occasion.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE several rubber manufacturing plants throughout Rhode Island continue to be rushed with work, practically all lines being pushed to capacity. Notwithstanding the long period of unprecedented activity every indication, according to those in close touch with affairs in general, is that this condition may be expected to continue for many months, at least. One of the gravest problems confronting the various plants is the shortage of help, although all of the concerns are paying a higher wage scale than ever before in order to secure workers. Orders for immediate delivery are plentiful, with additional requisitions for future shipment being received daily.

* * *

The wire-insulating department of the National India Rubber Co., Bristol, resumed operations May 31 after a shutdown from the 27th for the purpose of taking an inventory.

The work of enlarging the vulcanizing department at the plant of the National company is rapidly nearing completion. With the completion of the new buildings at the west end of the company's plant, the National will have one of the largest and most thoroughly equipped vulcanizing departments in the country.

The election of George Schlosser as vice-president of the National India Rubber Co., and his taking charge of the Woonsocket and Millville plants, has necessitated numerous changes and promotions in the executive staffs of these plants, in order that Mr. Schlosser may have more time for his managerial responsibilities. Among these changes is the promotion of Superintendent Henry C. Wagner to the position of factory manager of the plants at Woonsocket and Millville. Herman Fahrenholz, who has had general oversight of the manufacturing end of the Alice mill at Woonsocket, has been made superintendent and William H. Schlosser, who has been in charge of the Alice mill calendering room, has been made assistant superintendent. Waldo E. Kelly, who has been chief clerk and purchasing agent at the Alice mill, has been appointed secretary to the manager.

James W. Franklin has been appointed superintendent of the footwear department, and Frederick L. Dunbar, superintendent of the wire insulating department. Both were assistant superintendents. Edward L. Cooper, who has been connected with the plant for several years, has been appointed overseer of the packing division of the shoe departme t.

A gold watch and chain were presented to Cornelius J. Gallagher on June 17 by the employes of the packing department of the National India Rubber Co., of which he had been in charge for several years. The presentation was made by Superintendent James W. Franklin. Mr. Gallagher severed his connection with the company that afternoon to take up another line of business.

* * *

Colonel Samuel P. Colt, president of the United States Rubber Co., with nearly a score of guests, left on the morning of June 3 for his camp in Maine, where they remained for a fortnight. This camp is located on a chain of lakes at the base of Mount Katahdin, about 35 miles up the Penobscot river from Norcross, Maine, and the trip from Norcross is made in canoes. Trout, bass and other fish abound in these lakes and furnished the party excellent sport during their stay.

The Colonel's guests were Nathaniel Myers, Walter S. Ballou, Mrs. Imogene S. Waldron, Colonel and Mrs. Harold J. Gross, Mrs. Florence Beresford, Rev. George L. Locke, D. D., Countess Eleanor Moroni, E. A. Barrows, Mr. and Mrs. Wallis E. Howe, United States Senator LeBaron B. Colt, Dr. Calvin S. May, S. X. Constantinidi and Ernest Hopkinson.

* * *

The joint standing committee of the fire department of the Woonsocket city council has awarded a contract for 1,000 feet of hose to the Gutta Percha & Rubber Manufacturing Co., of Boston. There were eleven firms that submitted bids.

* * *

The Board of Aldermen of Newport has awarded contracts for 2½-inch fire hose to J. T. O'Connell (Bay State Rubber Co.) and K. Postel (The B. F. Goodrich Co.) for 500 feet each, at 80 cents.

* * *

The Phillips Insulated Wire Co., of Pawtucket, has been authorized to increase its capital stock from time to time by vote of the directors to an amount not exceeding $2,500,000. All shares are to be common of $100 par value.

* * *

Large shipments by both freight and express have been made almost daily during the past few weeks from the Millville plant of the Woonsocket Rubber Co. Extensive improvements are in course of construction, a new concrete driveway of considerable proportions having recently been completed.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

THE Trenton Chamber of Commerce is planning for a permanent exhibit of goods made in Trenton factories. If the plan is carried out there will be considerable space devoted to the products of rubber mills. The plan of the organization is to acquire a building in a central part of the city for meeting quarters, with space for the exhibit on the ground floor.

* * *

The Empire Rubber Manufacturing Co. is erecting a $2,000 addition to its plant.

General C. Edward Murray, of the Empire company, has been publicly complimented by Governor Fielder for his prompt and efficient work as Quartermaster General when the recent call was received for the mobilization of the New Jersey National Guard. General Murray had planned to leave Trenton shortly with his family for an extended cruise on his yacht, to various places of interest on the great lakes.

* * *

The Thermoid Rubber Co. has given out a contract for an addition to the plant to cost $18,000. It is to be two stories high and absolutely fire proof and will be used as a vulcanizing department.

* * *

The Three Star Tire Co. is to have spacious salesrooms in a new garage to be erected on North Montgomery street.

* * *

Richard Barlow, proprietor of Barlow's Hotel, in this city and a member of the De Lion Tire and Rubber Co., died recently at the home of his daughter in Ohio. Mr. Barlow, who lived in Ohio before settling in Trenton, was buried in that state.

* * *

According to printed reports the American Tire Sales Co. of Washington, D. C., planned to take over the plant of the Mecca Tire Co. on June 15. This report could not be verified in Trenton as none of the interested parties live here. THE INDIA RUBBER WORLD correspondent visited the plant after the date mentioned, but there was no sign of activity about the place. It is said the office furniture of the Mecca company has been removed, as well as some of the stock.

KEEPING EMPLOYES CONTENTED.

By Ernest A. Dench.

IT is difficult to keep employes who work in outlying districts thoroughly contented, for the call of the city is strong. It is possible, however, to curb this desire somewhat by entertaining the workers with motion pictures, a method that the Beacon Falls Rubber Shoe Co., Beacon Falls, Connecticut, has found highly satisfactory. The theater is the only one in the village, has seating accommodation for 400, and standing room for an additional hundred. Only the men and women employed at the plant and their families are admitted. The building, constructed of stucco, is equipped with two projection machines, in order to present feature productions without an intermission at the end of every reel.

Photoplays are the same, whether shown at the most pretentious theater in New York or at the smallest hamlet. There is no such thing as a Number One Company, the only difference being that some of those presented may not be in perfect condition, though still capable of giving satisfaction.

The first thing needed for a moving-picture show is an adaptable building. In the early days of the film industry the exhibitor usually did business in a converted store. Since that time the authorities have become far more strict and the public much more fastidious, consequently the modern exhibitor has had to erect a pretentious building in its stead. As a result makeshifts are not so general.

But the position of an operator in a manufacturing plant is entirely different from that of a proprietor of a picture house in the city. The employes will not protest, because they do not view photoplays under such perfect conditions as prevail in the towns and cities.

In selecting an existing building on the plant which can be remodeled into a passable photoplay theater, the following points should be borne in mind: The room should be lofty, well-ventilated and large enough to accommodate all the employes and their families. It should also be free of obstructions in the way of pillars and other supports, and should, moreover, be situated on the ground floor.

If the building is constructed of wood, this does not make it wholly unsuitable; but to make it safe, plastered metal laths or wire mesh should cover the walls and ceilings.

There should be at least four exits, which must open outward. It is advisable to divide the rows of seats into sections so as to provide for an aisle on each side, not less than three feet wide.

Chairs or benches should be fastened to the floor because if a fire occurs the seats will be overthrown and will interefere with the orderly egress of the crowd. It is customary in the design of such buildings to allow each spectator four and a half square feet of floor space.

The projection machine will cost from $250 to $300, according to make selected. The best standard makes include: The Simplex, which has many pleasing features in its construction, simplicity and safety being its outstanding points. The price is $300. The Motiograph is also popular, owing to its durability and guarantee given by its manufacturers. The Edison Kinetoscope may be recommended because it is easy to manipulate with little experience and stands hard wear. There are two models, one priced at $155 and the other at $250. The Edengraph excels in that it produces perfect projection when operated by an experienced operator, and possesses several improvements not contained in other machines. The selling price is $250. The distinguishing feature about the Cameragraph No. 6a is that a special device lessens the danger from fire. This costs $250.

The authorities insist that the projection machine be enclosed in a fireproof booth, so that if there is an outbreak of fire, it cannot spread beyond. Here an expense of $65 is involved, but it is worth it in the interests of safety. The booth, made of galvanized iron, is shipped in sections which are easily put together by means of bolts and nuts provided for that purpose.

In the days gone by a bed sheet or a table cloth has been used as a screen, but science has come to the rescue, and now there are screens and screens. To obtain the best results it will be necessary to pay about $1.50 per square foot for the materials used for that purpose.

The light by which to throw the pictures on the screen is usually obtained from an electric power plant. Failing this, a calcium gas-making outfit can be secured for $35; the gas can be manufactured at five minutes' notice and gives a 700-candle-power light.

In selecting suitable lens for the projection machine, the size of room, make of projection machine, the length and height of screen and distance from the booth must be taken into consideration. It is false economy to purchase a cheap lens, and the foregoing particulars should be furnished to the supply firm at the time of ordering.

MOTION PICTURE THEATER BUILT BY THE BEACON FALLS RUBBER SHOE CO.

Carbons are needed to run the projector. A case containing 1,000 costs from $17 to $45, according to market conditions.

A reliable operator will also be required. To obtain the services of one on full time will cost from $20 to $30 per week, but as he will only be on the job in the evenings, and then perhaps not every night in the week, it might be possible to arrange with someone on the staff, who has a practical knowledge of electricity, to undertake the work, and who would be paid, of course, for the additional time occupied by the work.

The operator will need a tool outfit, which should include cement for mending broken films, a file for sharpening carbons, lugs, reels and machine oil.

The average feature, at first, commands from $50 to $100 per day, but the price eventually drops to $10. But this type of production provides a whole evening's entertainment. As four single reels may be rented for $1.50 and upward, one is apt to decide in favor of the latter. It will be best to give both forms of entertainment a fair trial in order to determine which gives the most satisfaction.

The reels are rented from the nearest film exchange. It is customary to contract for a service and pay a week in advance. After this, the weekly requirements can be mailed, telephoned or telegraphed to the branch house and the films are despatched as required.

This plan of providing modern entertainment for employes is being considered by other prominent rubber manufacturing concerns in connection with their welfare work already under way.

METHODS OF TESTING COTTON FABRICS AND RUBBER PRODUCTS.

COMMITTEE D-13 of the American Society for Testing Materials presented tentative methods of tests for consideration at the annual meeting held at Atlantic City, New Jersey, June 27-30.

TESTING COTTON FABRICS.

The tentative tests for automobile tire fabrics submitted last year by the committee have been amended and continued as "Tentative General Methods for Testing Cotton Fabrics."

The new features included are:

1. Definition of "Dry Condition" and "Standard Condition" with respect to moisture.
2. Method of determining the thickness of the fabric.
3. Two alternate methods, designated as "grip" and "grab," for determination of tensile strength.

DEFINITION OF MOISTURE.

DRY CONDITION. The dry condition of cotton material shall be understood to be absolute dryness obtained by material placed in a ventilated drying oven maintained at a temperature of 221 to 230 degrees F., and dried to constant weight as determined by two consecutive weighings not less than ten minutes apart, and showing a further loss of not more than 0.1 per cent of the previous weighing.

STANDARD CONDITION. The standard condition of cotton material shall be understood to be the condition in which it contains 8.5 per cent of its dry weight of moisture.

THICKNESS OF FABRIC.

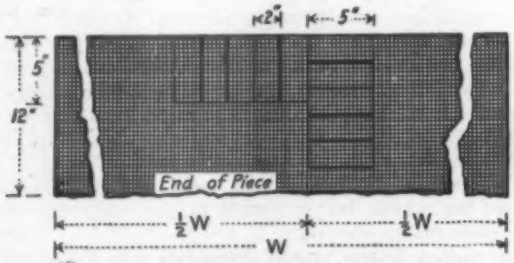
The thickness shall be measured by an automatic spring micrometer which presses upon at least 0.5 square inch of the fabric with a uniform constant pressure, and which is so mounted as to make measurements 6 inches from the selvage.

At least 10 measurements at different portions of the roll or piece shall be made, and the average shall be the thickness of the fabric.

TENSILE STRENGTH TESTS.

STRIP METHOD OF TEST. The test pieces of fabric are taken as shown in THE INDIA RUBBER WORLD (August, 1915, page 612), and are ravelled to the specified threads per inch.

GRIP METHOD OF TEST. The test specimens shall be taken as follows: Starting at a line in the center, warpwise, lay off



LOCATION OF TEST SPECIMENS, GRAB METHOD.

adjacent to this line five specimens on one side, parallel to the line (warp) and five specimens on the other side perpendicular to the line (filling). The test specimens shall be cut 5 inches long by 2 inches wide. The specimens are not reduced in width by ravelling, but are broken in a clamp that grips 1 inch width.

Where material requires special treatment, the committee intends to prescribe specific methods and tests which will be given precedence over the general methods. Two such tests have been prepared, one for automobile tire fabrics and the other for hose and belting duck.

AUTOMOBILE TIRE FABRICS.

The count per inch is determined by aid of the count scale shown in THE INDIA RUBBER WORLD (August, 1915, page 612), and the strength determined by the "Strip Method" in the "Dry Condition" mentioned above.

FABRICS FOR HOSE AND BELTING.

The use of the "General Tentative Methods" is required, with the special requirement that the strength shall be determined by the "Grab Method," and the specimens, when tested, shall be at standard condition as defined above.

RUBBER EXPANSION MOLD IN METAL SHAPING.

The elasticity of rubber is utilized in shaping sheet metal objects in the die press. The operation of drawing or forming is a simple matter where the shape of the piece is such that it will clear the dies, and may be readily removed after forming. Many styles of brass bed ornaments, alarm clock and cheap watch cases, parts of gas and electric fixtures, however, are of such shape that the opening is smaller than the main diameter of the piece. Such articles are first drawn in the form of a shell, and then shaped by an expanding portion, made of rubber. Such an operation is here illustrated. Figure 1 shows a shell of metal. Figure 2 shows the same shell, after being expanded in the dies shown in Figure 3.

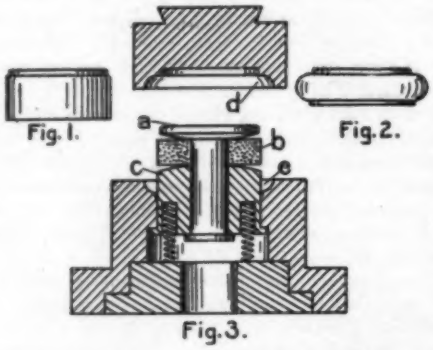


Fig. 3.

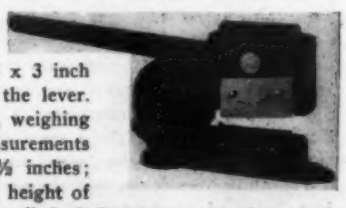
The shell is placed in the die surrounding the upper plunger *a*, the rubber washer *b*, and the upper part of the lower plunger *c*. The punch, or upper die *d* is then brought down by the action of the press. The lower plunger *c* descends against the pressure of the two coiled springs until it strikes the bed plate and can go no further. As the descent of the punch *d* continues beyond this point, the plunger *a* is forced down against the rubber cushion *b*. This action causes the cushion to expand laterally, thus forcing the shell to fill the annular space formed when the punch *d* has descended to *e*.

Upon the rising of the punch the coiled springs and rubber washer resume their original form, and the finished piece, Figure 2, is removed.

The rubber for this work must be of a quality which will stand a very considerable distortion without breaking, but sufficiently tough so as not to wear out too rapidly.

BRAKE LINING CUTTER.

This is a small, compact, hand-operated machine of great strength, constructed to accurately cut brake linings with ease and despatch. The eccentric device that operates the shear blade requires very little effort to cut ⅜ x 3 inch lining with one stroke of the lever.



The machine is compact, weighing only 17 pounds. The measurements are: Length of blades, 3½ inches; length of bed, 10½ inches; height of bed, 6½ inches; length over all, including lever, 18 inches. It is intended to be attached to a bench or convenient table. [The Peck Stow & Wilcox Co., Cleveland, Ohio.]

THE UNIVERSALITY OF THE RUBBER HEEL.

THE nerve-relieving quality of the jarless rubber heel has received world-wide recognition; and in frugal countries, where economy is a prime consideration, the demand for rubber heels on that score has constantly increased. It is safe to say that rubber heels of one variety or another are worn today in practically every civilized country, one style being particularly popular in one quarter of the globe and another, perhaps totally different, being preferred somewhere else. For instance, in the United States there are comparatively few revolving rubber heels worn. While the rubber heel in this country has long enjoyed a considerable vogue, it is almost invariably the solid rubber heel having practically the same shape as the leather heel it displaces and being quite as immovable. But in many other countries the revolving heel that permits the wearer, by changing the position of the heel from time to time, to get the maximum amount of service, is held in high esteem. The following brief review of the trade and varying tastes in rubber heels, in certain selected districts, may be of interest.

In England, according to reports, the solid heel is very little worn, and the revolving heel has also lost favor. But quarter tips, which are applied to that part of the heel that first strikes the ground in walking, are very generally affected.

In France, high-quality heels are most in demand, the circular heel, turning freely, being the only kind used. In Havre there is an extensive trade in these heels. A practical two-part heel has been put on the market, having a section attached immovably to the heel of the shoe, and a circle of rubber fitting into it and turning freely, both being of the same material.

In the principal cities of Bohemia—Prague, Pilsen and Budweis—the use of rubber heels has become general, and it is reported that in other towns and villages in Austria the demand for them is growing. Low-quality heels of reclaimed rubber, although stiffer and less elastic than those made of new rubber, are in greater demand because of the difference in price. Almost all the rubber heels used in this country are manufactured in Vienna. Of course, the continuance of war and the increasing scarcity of rubber greatly lessens the present use of rubber heels of any variety throughout Austria and Germany.

The two styles of rubber heels most popular in Spain are of German and American make. The American heels—bought from a leather house in Madrid—are the best wearing on the market, yet it is said that before the outbreak of the war their sale was exceeded twice over by those of the Germans. In Almeria round rubber heels are worn extensively. They are fastened with a single screw and may be revolved when one point is worn. The stock is drawn mainly from Barcelona through agents in that city of German and British manufacturers, and the selling price is nearly double the purchase price.

In Basel, Switzerland, the rubber heel is popular, especially with the middle classes, who conserve the life of the shoes by heavy leather soles, and heels reinforced with rubber. The heel-shaped rubbers with leather inlay are the most used, the heel being fastened on by wooden pegs driven through the leather inlay. They also use the rubber-edge, covering only the portion of the heel most exposed to wear, and the round, metal-cross-center rubber heel.

In the larger cities of the Union of South Africa rubber heels are worn by a majority of the population, the round and square heels having the greatest sale in the district of Johannesburg. Buying through local agencies is preferred, and the establishment of American agencies in this district is recommended by the local consul.

In the island of Jamaica it is estimated that about one-tenth of the population wear rubber heels. The round heels and those shaped to fit the latest style shoes are most in demand. Buying is done direct from the manufacturers or through New York commission houses.

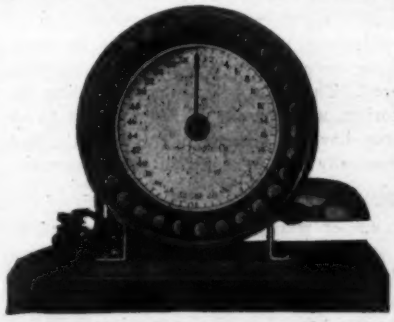
An importer in Rosario, Argentina, who has handled a variety of heels, now imports almost exclusively a high-grade American make which he sells to retailers at $3.82 per dozen pairs.

A SPANISH RUBBER-SOLED SHOE.

The fame of THE INDIA RUBBER WORLD is exemplified when a shoe manufacturer in Spain, and 30 miles from a railroad, sends here a sample of his work for examination. Armando Fernandez has had excellent results with a rubber sole, claimed to be made entirely from reclaimed rubber from automobile tires, and this sole is so firmly attached to the leather upper that even on the cobblestone pavements of Cordova it has shown no signs of separation until worn out. The maker claims it will wear three times as long as a leather sole. His method of fastening to the welt is by the usual machine or hand sewing, the first layer of rubber being less than one-eighth of an inch in thickness, and to this is cemented a second layer which covers the stitches. The heel is built up of lifts, the outer layer of the sole continuing along the shank, down the breast of the heel and folding over to form the top lift. The sole and heel are deeply scored by diagonal lines forming diamond studs. It is said that the French Government has found these so durable that after a trial, an order was given for 700,000 pairs through the Parisian agent, Ricardo Vazquez. Certainly this Spanish inventor has produced a wonderfully fine piece of rubber if, as he claims, it is made from automobile casings, though from its red color it may have been made entirely from inner tubes; and his method of attaching seems to have some points which might be worthy of emulation by American manufacturers.

AN INTERVAL TIMER.

Small rubber articles, such as rubber heels—usually called mechanical rubber goods—are made in metal molds, and subsequently cured in a steam-heated press vulcanizer for a certain period of time. The old way was to chalk down on some post or convenient surface of the press, the time to take the molds out of the vulcanizer. The inevitable results were the loss of considerable time through the necessity of constantly watching the clock and the production of overcured goods caused by negligence on the part of the forgetful operator.



The Acme Interval Timer is a specially constructed clock, operated by electricity, and would appear to be almost infallible. It is extremely easy to operate as the following directions indicate: Note the position of the dial hand when the mold is put in the press, or if more convenient turn the hand forward to the zero position shown in the illustration. Press the button opposite the numerals representing the number of minutes desired for the cure. When the time has expired the bell will ring—then pull the button out as far as it will go. Thus any number of cures, up to thirty, can be taken care of at the same time. [Acme Supply Co., Ionia, Michigan.]

The India Rubber Trade in Great Britain.

By Our Regular Correspondent.

WITH the passing of the Compulsory Service Bill for married men the question of labor in rubber works has now reached an acute stage and many small manufacturers are at their wits' end how to carry on. Unlike banks and business houses, generally, rubber works have long been accustomed to employ female labor for tasks for which it has been found adequate and suitable, and the managers know better to what extent it is possible or advisable to replace men to a greater extent by women, than do the official compilers of a detailed list of occupations in which further substitution is recommended. For instance, it is difficult to find any approval in the trade for the proposal that women might be substituted for men on heavy machinery such as washers, mixers and calenders, and it will more likely result, in the case of small works, where the mixers have gone, that their work will be abandoned for the time being. Certain relaxations of the Factory Acts, especially with regard to the employment of women, have been officially granted and, in fact, every encouragement is being given to manufacturers to get along as best they can under the altered conditions. Of course there is no shortage of materials, and consequently no need to turn out special war qualities of goods such as are pathetically referred to by the correspondent of THE INDIA RUBBER WORLD in another country. At the same time one often hears of goods, especially certain lines of proofings, being accepted by buyers, though they have imperfections which would have caused their rejection in other days. Nowadays, the buyer has often to eat humble pie to get the goods he wants and he cannot afford to be too particular or to stand too much on his dignity.

THE TIRE IMPORT DECISION.

The decision of the government not to stop the import of foreign tires has led to a good deal of feeling in quarters where a ban on the import of American tires had been confidently anticipated. The difficulties in the way of interfering with the American business under certain agreements now in operation between the two countries had not been appreciated, and though the position is accepted philosophically, there is a strong disposition to grumble, and further endeavors, it is understood, will be made by some of those directly interested, to see if the government decision cannot be altered. The latest restrictions regarding the use of petrol for motoring, whereby the pleasure car is to be penalized, will, of course, have an adverse effect upon the tire trade and should automatically lead to a reduction in imports.

WOOLWORTH BUYING ENGLISH RUBBER GOODS.

Some of the smaller rubber works which are not engaged on government work are busy turning out goods which larger firms have no time to attend to. For instance, large orders for rubber sundries have been received from America, which I understand went to Germany in pre-war times. In this connection the name of the large American firm, F. W. Woolworth & Co., is mentioned. This firm, which deals in a large variety of goods sold at low prices, has, I understand, 300 shops in America and possesses a building 50 stories in height.

WILL CONSIDER THE GARMENT WORKERS' STRIKE.

The recent formation of a waterproof section of the India Rubber Manufacturers' Association is interesting and is another instance of the advance in activity of the association since the present chairman, Mr. Goudie, took office. The new section has an important matter in hand in the dispute as to wages in the waterproof garment trade in Lancashire, no settlement having yet been reached.

RAW RUBBER.

The position remains more satisfactory to the manufacturer than the producer, the demand for spot rubber being quiet, showing a tendency to await future developments. At the same time, holders of stocks are in no hurry to sell, believing that the big consumers cannot hold off the market much longer. The expected depletion of British stocks has not come about, mainly on account of the smaller exports to the United States, due to greater difficulties in obtaining export licenses.

THE SYNTHETIC BOGEY.

From authentic accounts to hand, it seems to be a fact that the German shortage of raw rubber for tires has been overcome by the use of synthetic rubber, which has given satisfaction in the war zone. This, though interesting, does not, of course, affect the view generally held that there is extremely little likelihood of synthetic rubber competing with natural rubber in normal times. Nowadays, when certain materials are wanted for war purposes, the price is a very secondary consideration and it is quite probable that at the present price of raw rubber in Germany the synthetic product can compete successfully. Famine prices for certain goods, especially chemicals, are being paid in most of the belligerent countries at the present time and no outcry comes from the sellers thereof, whatever the buyers may have to say on the matter.

NORTH BRITISH RUBBER CO., LIMITED.

The May meeting of the Edinburgh and East of Scotland Section of the Society of Chemical Industry was held in the new laboratory of the North British Rubber Co., Limited, Castle Mills, Professor Walker presiding.

W. A. Williams extended to the society and the visitors a hearty welcome on behalf of the management of the company and expressed the hope that the meeting would be the forerunner of many others in the district and that manufacturers would come forward and show the society what they were doing in scientific and, particularly, chemical work. He apologized for the absence of the company's general manager, Mr. Johnstone, and for the fact that on account of the depletion of the laboratory staff by about 50 per cent through the war, there was not so much to show them as if the times were normal. Professor Walker, in reply, said it was excessively kind of the North British Rubber Co. to let them have this opportunity of seeing its laboratories. It was just at a time like this when the war had made their minds more open than usual that these privileges were most useful and most appreciated. He had always felt from the academical point of view that those who taught in universities had far too little experience in seeing how matters were conducted on a technical and commercial scale, and it was quite certain that if we were to hold our own in the industrial competition which was sure to follow the war, not only with Germany but with other nations, we must more and more have the combination of technical with academic chemistry. The academic chemists must have their minds directed towards the technical openings of the theories and researches which they put before the students and, on the other side, the technical students must be ready to welcome the latest results of research. A paper on the "Raw Material Used by the Rubber Manufacturer" was read by B. D. Porritt and one on "Some Aspects of Synthetic Rubber" by B. D. W. Luff.

EXPORTATION OF TALC PROHIBITED.

The government has added talc to the list of articles the exportation of which is prohibited to all foreign countries in

Europe and on the Mediterranean and Black Seas other than France, Italy, Russia, Spain, and Portugal.

PERSONAL MENTION.

Arthur Mallaby, who, in conjunction with Mr. Bentley, started the Bradford Rubber Co., Shearbridge, Bradford, Yorks, two years ago, reports business as brisk in articles such as rubber tea pot spouts, door stops, gas tubing and molded and cut push-on gas connections.

The Enfield Cable Manufacturing Co., at Brimsdown, Enfield, Middlesex, is now in full swing under the management of Mr. Cowup.

The Birthday Honor list contains the name of Arthur Philip Du Cros, who has been made a baronet. Sir Arthur Du Cros, M. P., for Hastings, is the managing director of the Dunlop Rubber Co. Besides holding a post at the Ministry of Munitions, he has taken an active part in the provision of motor ambulances for the war.

Another name on the list is F. W. Whitby-Thomson, who has received a knighthood. He is connected with the English Card-clothing Manufacturers' Association.

Dr. W. A. Caspari, Ph.D., has received the degree of Doctor of Science from the Victoria University, Manchester.

In case any confusion should arise, I may mention that the Premier Waterproof & Rubber Co., of Bromley street, Manchester, is quite distinct from the Premier Rubber Works, of Bent street, Chatham, Manchester. This works is owned by W. S. Rothbaud & Co., patentees and manufacturers of india rubber and vulcanite surgical appliances.

The waterproofing works of both Ferguson, Shiers & Co., Limited, and A. O. Ferguson & Co., near Manchester, have had outbreaks of fire, but without seriously interfering with the businesses.

The will of the late J. E. Baxter was proved for £10,379 and that of the late W. M. Henderson for £27,257.

OTHER BRITISH NOTES.

A TIMELY AND INGENIOUS ADVERTISEMENT.

A clever advertisement, especially timely, was that of the Republic Rubber Co., Limited, London, which appeared in the "Observer" and "Sunday Times," the day when the daylight saving bill went into effect. It read: "As clear as DAYLIGHT is the SAVING you effect by fitting Republic Tires." A clock face was shown, as here reproduced, and subheads in the advertisement read:

"On the one hand you have service," "On the other hand you have durability." These, of course, have direct connection with the illustration of the clock, which is a splendid example of connective advertising, that everyone is striving to attain.

The idea and its working out was by Ernest A. Gleich, managing director of the London "Republic" organization, who believes in striking while the iron is hot, especially in getting out novel automobile advertising.

LETTERS OF THANKS TO THE RUBBER GROWERS' ASSOCIATION.

Our friends of the Rubber Growers' Association, London, have been kind enough to forward us a copy of a circular which Secretary Frank G. Smith recently sent to the members, calling attention to the great value of the 4,500 pairs of rubber boots, donated by them, to the men in the trenches. A perusal of this circular gives an idea of the appreciation of the wearers; containing, as it does, extracts from a score of letters chosen from the many received from officers and men of the various units of the British army in the fighting lines, telling how the men have been made comfortable and saved from cold and pneumonia, and possible death, by these boots, so generously donated. This circular, which is sent only to the members of the Rubber Growers' Association, states that if the war should extend through another winter, there is no doubt that further supplies, in greater number, will be despatched.

TYPKE & KING'S NEW ADDRESS.

Typke & King, Limited, chemical manufacturers, London, England, with a view of centralizing their business, have removed their offices to their manufacturing plant, and their address is now "Crown Chemical Works, Mitcham Common, Surrey, England." Thus all their business is consolidated, though they still retain a buying office at the old 16 Mincing Lane address. It is their desire that all communications shall be directed to Mitcham. Their cable address is now "Valerianic, Mitcham."

THE GOODRICH COMPANY'S LONDON TIRE DEPOT.

The B. F. Goodrich Co., Limited, London, England, is now maintaining a tire-fitting depot, furnished with a thorough equipment for dealing efficiently with all kinds of truck tire repairs and renewals. It is stated that nearly 14,000 tires are carried in

stock, in both millimeter and inch sizes. The latter are of increasing importance in view of their general use on American chassis. A corner of the new tire depot shown in the illustration gives a good idea of its spaciousness, and of the abundance of stock carried.

THE SITUATION IN FRANCE.

By Our Regular Correspondent.

IT occurs to me that your American readers would be interested in a few details regarding general industrial conditions here in France today, and the conditions that are likely to prevail after the conclusion of hostilities. Much speculation on this subject has been evidenced in foreign newspapers, and I have noted that the real situation is not well understood by American writers.

VALUE OF THE FRANC IN FRANCE.

The value of a franc in France is the same as it always was. Its exchange value is much less, due to the fact that the balance of trade is against France. As a consequence of this, the purchasing value has fallen. In France a franc purchases less now than in normal times because everything is more costly. It is not the franc that has changed in value, but it is the things that one purchases in France that have become dearer because of lesser supply or greater demand.

PRODUCTION COST OF RUBBER GOODS.

As a consequence of prevailing conditions here, the rubber industry is burdened with additional costs that can be classed as follows:

First; costs affecting the raw material, caused by higher rates of exchange in the Far East and other regions producing crude rubber; increased ocean freight charges, in many instances as much as 250 per cent; increased cost of marine insurance, in some cases amounting to 1,425 per cent and small increases in the costs of handling merchandise, stevedoring, etc., due to labor shortage.

A second cause for high costs is the increase in maintenance expenses, that is to say, the upkeep of machinery, appliances and equipment, due to higher cost of such materials as iron, steel, copper, wood, leather, etc.,—in general, all factory supplies. This increase amounts on an average to 100 per cent.

Third, general overhead expenses are extremely high; coal, mineral oils, greases, chemical products, cardboard, paper, stationery, etc., have all advanced 100 per cent.

GENERAL EFFECT ON MANUFACTURING INDUSTRIES.

Taking into account the universal military service throughout France, it can easily be understood that the effect of the war upon manufacturing industries has been very pronounced. The help is taken away, no one is left behind to do the work except those physically unable to serve in the army. Raw material is hard to obtain, and it is costly. Coal is three times as high as in normal times. To all of this is to be added the difficulty of running a plant under such a disorganized condition of affairs as necessarily prevails. Few plants can reach normal efficiency.

Industries dependent upon enemy countries for certain articles such as dyestuffs, or which are dependent upon such countries for the sale of their products, are naturally great sufferers.

Industries are going ahead, but in a much crippled manner. Business is good. The only difficulty is to fill orders.

CONDITIONS AFTER THE WAR.

After-war conditions are being freely discussed throughout France, and there will be no lack of initiative in going ahead as soon as peace is reëstablished. The great industries of the invaded territories will be rapidly reconstructed and reorganized. In those districts machinery has suffered as much as buildings. The latter can be easily and rapidly reconstructed, but the machinery problem will present greater difficulties. The market which war-stricken districts will offer is enormous. Everything there appears to have been either stolen or destroyed. When the men come back from the trenches, they too will have to pass through a period of reconstruction, as they have been away so long from civilian life.

Wages after the war will be higher than they were previous to the great struggle, so will raw materials, and, consequently, the cost of production will be greater than before the war. Freights also will be on a high level.

TREATIES.

The allied nations will arrange treaties and tariffs to favor themselves and their colonies. Increased and discriminating export duties will be placed on colonial products and arranged so as to favor the Allies. In this respect the Central Powers are sure to be placed at a great disadvantage for the supplies of such colonial products as rubber. The great demand for labor, if nothing else, is sure to make labor high, and it is certainly easier to increase wages than it is to reduce them.

DUMPING.

I understand that in America, you fear the dumping of stocks of merchandise accumulated in Europe during the war. I do not believe this fear well-founded. The Central Powers have acquired much material as a result of conquest, but with the prolongation of the war and the Allies' blockade, these powers will have been obliged to use up much of their spoils. This opinion is supported by the following instance: The invaders took enormous quantities of cloths and fabrics from the Lille-Tourcoing-Roubaix district, but they are obliged to use these goods; we have captured prisoners wearing uniforms made of Roubaix cloths, and have brought down aeroplanes, in the make-up of which we found much Lille-made linen. Of course, these are but instances, but they indicate conditions and speak louder than words.

No doubt there will be some dumping in certain lines of merchandise, but I believe little is to be feared on this score. It will be found that the Central Powers, like France and her Allies, will have been more engaged in making shells and other war munitions than in making great stores of manufactured goods.

RECAPITULATION.

After peace is reëstablished, and after the period necessary for reorganization and the return to normal conditions, the cost of manufacturing in France will approach the same level as before the war, but will be rather above than below ante-bellum levels.

Raw materials will continue at high prices for a year or so, due to the exhaustion of supplies throughout Europe.

TIRES FOR MILITARY PURPOSES.

The situation here is practically the same as it was when I mailed my last letter. The Verdun struggle is still on, and, besides men and ammunition of all kinds, it continues to consume enormous quantities of rubber tires, both solid and pneumatic. However, there is no more shortage of

AN ARMY TIRE DEPOT IN PARIS.

tires here than there is a shortage of other elements of modern warfare. Worn tires are readily replaced by new ones and the constant travel of rubber-tired vehicles, to and from the front, continues without interruption. To fill the demand has been a heavy task, but we were ready for all emergencies and everything has been moving like clockwork in the industries as well as in the army.

IMPORTS PROHIBITED.

Recent presidential decrees prohibit the importation into France and Algeria of various articles, among which are automobiles, automobile rims, bicycles and parts thereof.

OBITUARY.

It is my sad duty to inform you of the death of Lieutenant C. L. Gatin, one of our leading tropical agricultural scientists, who was a representative of France at the last (1914) Rubber Exhibition in London and a member of the expert staff of our leading tropical agricultural paper, the "Journal d'Agriculture Tropicale." Lieutenant Gatin was killed while leading his company of Zouaves in the defense of Verdun. His premature death is mourned by his wife, his mother and hosts of admiring friends.

PERSONAL.

Lieutenant Alcan, of the firm of Alcan & Cie., successors to Hecht Frères, Paris, dealers in rubber goods, has been made Knight of the Legion of Honor, a deserved recognition of his special valor in the present war.

Rubber Planting Notes.

COSTS OF PRODUCTION OF PLANTATION RUBBER.

THE advisability of publishing or not publishing costs of production of plantation rubber is a subject that is troubling the minds of the directors of Far Eastern rubber plantation companies.

With the constant growth of the consumption and the increase in production of plantation rubber, the cost of production has been decreasing. Each year the cost is lower than the preceding, a tendency that is in evidence in the following table, compiled from figures disclosed in company reports recently published. This shows the production cost per pound of dry crude rubber for the past three years.

	Cost per Pound in U. S. Currency.		
	1913.	1914.	1915.
Banteng (Selangor) .....*cents*	48.74	33.33	28.33
Bekoh	44.00	38.33	29.00
Batak Rabit	32.50	32.33	29.00
Broome (Selangor)	56.00	37.33	31.00
Bukit Lintang	39.33	30.33	24.60
Inch Kenneth	39.40	31.33	29.00
Kamuning	44.33	29.33	28.00
Seaport	46.33	34.33	28.33
Seletar	50.66	38.33	26.00
Sangkai Chumor	43.33	32.00	26.00
Tanjong Malim	53.66	41.00	31.00
Average cost	45.30	34.36	28.20

TAPPING SYSTEMS.

In his annual report on agriculture for 1915, in North Borneo, E. Bateson, director of agriculture, made some remarks on tapping systems. He wrote:

It will probably be some years before the relative merits of the different systems are definitely established to the satisfaction of everyone; in the meantime it is desirable to adopt the system which has the balance of experimental evidence in its favor. The system which appears likely to become most general in North Borneo is that of placing two cuts one above the other on a single quarter of the tree. On anatomical and physiological grounds, however, there is good reason for believing that it is better to place the two cuts on adjacent quarters. This has been confirmed by tapping experiments in the Federated Malay States, which, so far as they have gone, all indicate the superiority of the adjacent-quarters system in point of yield. A further advantage of this system is that it favors the nourishment of the renewing bark, and gives quicker renewal than the single-quarter system. When trees are tapped on adjacent quarters the cuts are commonly made in the form of a V, but it has been proved that a tapping cut sloping up to the left yields about 14 per cent more rubber than a cut of the same length sloping up to the right. A left-handed half-spiral, therefore, will yield about 7 per cent more than the basal V.

EXPORT DUTIES ON CAMEROONS CRUDE RUBBER.

The British Board of Trade announces that the German imports and exports tariff remains in operation in the Cameroons, which is now under British military occupation.

The export duty on rubber, except plantation rubber, which is exempt from duty under special provisions, amounts to four cents per pound in United States currency.

RUBBER PROSPERITY OF THE FEDERATED MALAY STATES.

E. Burnside, Commissioner of Trade and Customs, Federated Malay States, in a speech at the general meeting of the Selangor Chamber of Commerce, reviewing the prosperity of the Federated Malay States in the last 25 years, said that in 1890 the total value of the trade of the four States amounted to only £5,714,187 [$27,808,091], whereas in 1915 it was valued at £26,106,773 [$127,048,611]. The total exports of plantation rubber in 1915 amounted to 44,523 tons, with a value for revenue purposes of £10,897,365 [$53,032,047], more than 40 per cent of the total value of exports.

RUBBER IN NYASALAND.

The British Colonial Report on Nyasaland for the fiscal year 1914-1915, recently published, would lead to the belief that rubber cultivation is not a success in the Protectorate. With the low prices prevailing during the year covered by the report, little interest centered in rubber, and most of the estates in the Nyasaland Shire Highlands have ceased tapping or abandoned cultivation.

The harvesting of wild rubber has practically ceased, and at the prevailing prices there is little likelihood of any quantity of Ceara and wild rubber being exported. The *Hevea* rubber planted in the West Nyasa district is giving indications of satisfactory development. The value of the exported crop amounted to only £3,423 [$16,658], as compared with £9,598 [$46,709], showing a decrease of £6,175 [$30,050]. The area under cultivation dropped from 10,562 acres to 5,936.

RUBBER FROM GERMAN WEEDS.

MENTION has been made of the efforts of German scientists to obtain rubber from plants indigenous to Central Europe. The following letter, from a chemist in Leipzig, who has been drafted into government work, will be read with interest.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

In your excellent journal, dated May 1, 1916, your German correspondent speaks somewhat sceptically of the value of some plants as a source of caoutchouc. I write to inform you that German scientists have apparently found a really valuable plant for this purpose in *Lactuca Viminalis* (in German called *Rutenlattich*). Exhaustive tests have shown that the milk exuding from cuts in stem and root of this plant, after the latter has reached the age of 18 months, consists of a dark yellow liquid which on exposure to the air turns brown and becomes exceedingly tough and sticky. As the plant reaches a height of six feet, and the milk is fairly abundant, the yield of a field of *Rutenlattich* in this "rubber substitute" is not by any means to be despised.

According to the announcement of government chemists who have made the tests, the milk contains about .49 of caoutchouc, representing a very high percentage, as there are only a few rubber plants which exceed it (*Hevea Brasiliensis*—only .30; other *Hevea* species even less!).* Plans are said to be under way now to cultivate this *Lactuca* species throughout Germany, it being found wild only in the southeastern sections, south of the Warthe and east of the Elbe rivers, as well as in Austria-Hungary.

In the course of the investigations covering the various types of "rubber weeds" it was found that the *Gänsedistel* (goose thistle) yields a fair quality of caoutchouc to the extent of .16; *Wolfsmilch* (wolf's milk) contains .27 of caoutchouc, and many other plants of these families yield caoutchouc in quantities ranging from .12 to .25 per cent.

**Hevea Brasiliensis* latex yields from .30 to .45 of caoutchouc.

NEW JAPANESE RUBBER COMPANY.

The American Consul-General, Yokohama, Japan, reports that several business men in Tokyo and Osaka, Japan, are planning to promote a rubber company, with a capital of 2,000,000 yen [$997,000], in the Federated Malay States.

Constantinople, in normal times, annually exports waste rubber to the amount of 900,000 pounds valued at about $50,000. Rubber shoes are imported to the value of approximately $400,000, and the extent to which the United States participates in this trade is shown by the figures for 1913 and 1914. In the former year we sent to Constantinople 121,988 pairs, valued at $59,155. In 1914 the figures were 64,278 pairs, valued at $33,097.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED MAY 16, 1916.

NO. 1,182,925. Detachable rim for vehicle wheels. G. H. S. Moyes, Pittsburgh, Pa.

1,183,032. Elastic tire block for vehicle wheels. H. Raflovich, New York City.

1,183,033. Wheel rim and tire construction. H. Raflovich, New York City.

1,183,036. Artificial foot having a rubber heel. J. F. Rowley, Chicago, Ill.

1,183,037. Elastic leather, composed of elastic webbing and impregnated leather. M. Scheuer, assignor to American Belt Corporation—both of New York City.

1,183,060. Garment supporter comprising adjustable elastic strips. M. D. Brown, Baltimore, Md.

1,183,108. Hair clasp comprising an elastic band. E. Noyes, West Kensington, London, England.

1,183,180. Rim comprising an automatic tire remover. J. G. Faria, Willows, Calif.

1,183,212. Suction cup bracket support. W. Lenzikow and D. Bühler, New York City.

1,183,365. Safety tread. J. O. Fowler, New York City.

1,183,440. Pneumatic tire. B. W. Davis, Chicago, Ill.

1,183,481. Self filling fountain pen. O. A. Morrow, Pittsburgh, Pa.

1,183,518. Demountable rim construction. E. K. Baker, assignor to Universal Rim Co.—both of Chicago, Ill.

1,183,533. Demountable rim. E. P. Calvin, Sardinia, Ohio, assignor of one-tenth to W. W. Masters, Indianapolis, Ind.

1,183,545. Interchangeable rubber heel for shoes. T. Doody, Duluth, Minn.

1,183,595. Cushion tire. S. A. Rouse, Chicago, Ill.

1,183,727. Pneumatic wheel. J. Greppi and A. Romanach, Buenos Aires, Argentina.

1,183,728. Rubber nursing nipple. R. Griffith, assignor to The Miller Rubber Co.—both of Akron, Ohio.

1,183,796. Parachuting attachment for balloons. G. L. Bumbaugh, assignor of one-half to A. L. Watters—both of Indianapolis, Ind.

ISSUED MAY 23, 1916.

1,183,874. Dress shield stiffener. H. D. Hardcastle, Atlantic City, N. J.

1,183,914. Armored diving device. H. Usener, assignor to the firm of Neufeldt & Kuhnke—both of Kiel, Germany.

1,183,965. Tire. G. F. Fisher, Plainfield, N. J., assignor to Morgan & Wright, Detroit, Mich.

1,184,032. Bathing cap. O. Schron, Milwaukee, Wis., assignor to M. Neumann, Berlin, Germany.

1,184,118. Hoof pad. F. W. Oman, Spokane, Wash.

1,184,136. Tire plug embodying an elastic cushion. R. W. Sampson, Westmount, Quebec, Canada, assignor of one-half to L. Schwab, East Orange, N. J.

1,184,175. Non-skid tire protector. A. Goodall, Portland, Oreg.

1,184,220. Tire alarm. C. V. Amburgh, Tacoma, Wash.

1,184,225. Resilient shoe heel. J. H. Brown, Marseilles, Ill., assignor of one-half to J. H. Brown, Cleveland, Ohio.

1,184,229. Resilient wheel. D. L. Crosbie, Sacramento, Calif.

1,184,257. Construction of the covers of pneumatic tires. W. E. Muntz, London, England.

1,184,258. Tire shoe for vehicle wheels. C. F. Nickerson, Reading, Mass.

1,184,317. Water-excluding device for bathing caps. E. S. Bullard, Wheeling, W. Va.

1,184,325. Inflatable rescue float. J. S. Coxley, Massillon, Ohio.

1,184,371. Compression bulb. H. A. Myers, assignor of one-half to A. S. Hickok—both of Toledo, Ohio.

1,184,469. Method of making rubber and fabric piston rod packings. C. I. E. Maston, Midland Park, N. J.

1,184,484. Hose coupling. F. X. Müller, assignor to Republic Hose Coupler Corporation—both of Buffalo, N. Y.

1,184,632. Teat cup for milking machines. C. de Leon, Dayton, Ohio, assignor to N. D. Rutherford.

1,184,691. Bead for pneumatic tires. H. K. Raymond, assignor to The B. F. Goodrich Co.—both of Akron, Ohio.

ISSUED MAY 30, 1916.

1,184,717. Antiskid device. V. L. Bowman, Alameda, Calif.

1,184,820. Tire stem cover. R. A. Campbell, Minneapolis, Minn.

1,184,838. Implement for washing clothes. A. Edwards, New York City.

1,184,970. Syringe. W. W. Larssen, San Francisco, Calif.

1,185,044. Wheel rim. G. B. Austin, Jungo, Nev.

1,185,082. Rubber tire. A. G. Fitz Gerald, Boston, Mass., assignor to Reliance A. C. Co., Inc., New York City.

1,185,084. Tire protector. W. H. Gahan, Victoria, British Columbia, Canada.

1,185,119. Lineman's rubber shoe. H. E. Marshall, Highland Park, Mich.

1,185,215. Hose coupling. J. Lezzeni, Fairfax, Calif.

1,185,281. Resilient tire for vehicles. J. Beynon, Youngstown, Ohio.

1,185,365. Tire with tubular sections and filling of wool waste. F. D. Brown and Rose Seals Brown, Josephine County, near Grants Pass, Oreg.

1,185,386. Life-saving apparatus. J. L. Edlund, Claresholm, Alberta, Canada.

1,185,388. Extension fountain pen. H. P. Fairchild, assignor to F. G. Fairchild—both of New York City.

1,185,403. Vehicle wheel tire. F. A. Howarth, Philadelphia, Pa.

1,185,411. Rubber swimming glove. C. D. B. Kennard, Winnipeg, Manitoba, Canada.

1,185,432. Golf ball made from overwound strips of rubber and balata. L. T. Petersen, Youngstown, Ohio.

1,185,444. Non-slipping tread. F. H. Stanwood, Arlington, Mass., assignor to Stanwood Equipment Co., Maine.

1,185,445. Non-slipping tread. F. H. Stanwood, Arlington, Mass., assignor to Stanwood Equipment Co., Maine.

1,185,451. Rubber tire. J. Thomson and E. L. Pratt, Syracuse, Nebr.

1,185,583. Suction cup massage instrument. J. W. Bond, Providence, R. I.

1,185,606. Rubber heel. S. D. Smith, East Dedham, assignor of one-half to J. C. Kennedy, Boston—both in Massachusetts.

ISSUED JUNE 6, 1916.

1,185,660. Pneumatic tire and inflation means therefor. R. Harris and N. Harris, Newark, N. J.

1,185,684. Valve for pneumatic pillows and other articles. H. P. Kraft, New York City, and M. C. Schweinert, West Hoboken, N. J., assignors to A. Schrader's Son, Inc., New York City.

1,185,714. Non-skid vehicle tire. A. Rich, Stamford, Conn.

1,185,769. Emergency rim and tire. R. E. Cloud and F. C. Taylor, Ensley, Ala.

1,185,986. Pneumatic tire. P. J. Collins, New York City.

1,186,029. Demountable rim. P. Overman, assignor of one-half to H. V. Turner—both of San Francisco, Calif.

1,186,153. Vehicle tire-filler comprising a rubber-covered felt core. R. S. Wicks, Mount Vernon, Wash.

1,186,160. Inner casing for automobile tires. C. L. Archer, Council Bluffs, Iowa.

1,186,225. Nipple. L. R. Neiswender, Phoenixville, Pa.

1,186,311. Tire for motor vehicles. J. H. Hamlin and J. C. Burford, Winston-Salem, N. C.

1,186,316. Rubber friction elements for hat bands. R. H. Holmes, Woodmere, N. Y.

1,186,437. Pneumatic tire. D. C. Roberts, Trenton, N. J.

1,186,453. Resilient non-collapsible tire. D. E. Tillman, Selma, Ala.

1,186,460. Automobile tire. E. D. Wassell, Wilkinsburg, assignor of sixtenths to H. B. Wassell, Pittsburgh—both in Pennsylvania.

1,186,467. Flexible metallic protector for rubber tires. F. H. Brueggemann, Norwood, assignor of one-fourth to J. W. Heintzman, Cincinnati, and one-fourth to H. P. Rohmann, Norwood—all in Ohio.

1,186,472. Rubber tire. W. B. Estes, assignor of one-half to M. F. Amonett, E. L. Amonett, and J. M. Amonett—all of West Orange, N. J.

1,186,492. Noise reducing platen for typewriters. W. R. Mulock, Winnipeg, Manitoba, Canada.

ISSUED JUNE 13, 1916.

1,186,550. Hand rail for escalators comprising a channeled member of rubber. H. Z. Cobb, Winchester, Mass., assignor to Revere Rubber Co., Providence, R. I.

1,186,551. Flexible hand rail for escalators comprising a circular rubber impregnated braided strip. H. Z. Cobb, Winchester, Mass., assignor to Revere Rubber Co., Providence, R. I.

1,186,613. Stretchable leather belting which comprises a sheet of elastic. M. Scheuer, assignor to American Belt Corporation—both of New York City.

1,186,722. Hose coupling. G. E. Young, Waterbury, Conn.

1,187,006. Packing. N. B. Miller, Haddon Heights, N. J.

1,187,029. Basket ball and similar playing ball. J. L. Beebout, Canton, Ohio.

1,187,065. Toy water pistol having a rubber bulb. C. W. Kallenbaugh, Duquesne, Pa.

1,187,106. Automobile wheel rim. W. B. Schaeffer, Portland, Oreg.

1,187,131. Teat cup. L. Bull, Libertyville, Ill.

1,187,132. Hose supporter. M. C. Calkins, Brooklyn, N. Y.

1,187,149. Method of repairing ruptured pneumatic tubes. J. C. Irvin, Jersey Shore, Pa.

1,187,150. Alarm for pneumatic tires. C. E. Johnson, Grand Rapids, Mich.

1,187,154. Tire or other valve. H. P. Kraft, New York City, and M. C. Schweinert, West Hoboken, N. J., assignors to A. Schrader's Son, Inc., New York City.

1,187,173. Tire chain and armor. W. J. Putnam, Deposit, N. Y.

1,187,260. Shock absorber for firearms. R. S. Cross, Westport, N. Y.

1,187,330. Device for locking electric lamp bulbs in receptacles having an elastic washer. F. Jordan, San Francisco, Calif.

1,187,386. Cable insulation stripper. A. A. Pehrson, New York City.

1,187,418. Blow out patch for pneumatic tires. J. N. Davis, Denver, Colo.

1,187,430. Hose clamp. W. F. Kenly, assignor of one-half to L. C. Grove—both of York, Pa.

[Chemical Patents will be found on page 537; Machinery and Process Patents on page 541.]

THE DOMINION OF CANADA.

ISSUED MARCH 31, 1916.

*167,989. Cover for a sink drain. D. J. Connell, Butte, Mont.
168,002. Infant's grooved feeding bottle with a rubber ring in each groove. O. H. Shultz and E. Benson, assignee of a half interest—both of Edmonton, Alberta, Canada.
*168,018. Teat cup for milking machines. C. O. Anderson, Lancaster, Pa.
168,031. Valve for tires. R. S. Burn, Hull, York, England.
168,055. Typewriter platen having an inner layer of elastic. W. R. Mulock, Winnipeg, Manitoba, Canada.
*168,088. Fountain pen. R. L. Warnock, Warnock, Ohio.
168,096. Rubber eraser for fountain pens. F. C. Graham, Aylmer, Quebec, Canada.
168,097. Pneumatic tire for vehicles. C. F. A. Gray, Montreal, Quebec, Canada.
*168,133. Fountain pen mechanism. The L. E. Waterman Co., Limited, St. Lambert, Quebec, Canada, assignee of E. F. Britten, Jr., Jersey City, N. J.
168,144. Spring tire. T. Comeau and A. E. Ouellet, assignee of a half interest—both of Lawrence, Mass.
*168,181. Non-skid attachment for tires. J. L. Duff, Cambridge, Ohio.
*168,213. Life preserver. J. E. Lomas, Smuggler, Colo.
168,225. Tire armor. M. J. O'Connor, South Porcupine, Ontario, Canada.
*168,227. Tire cushion. J. E. Parrish, Richmond, Va.
*168,263. Life-saving device. B. Zopfi, Santa Rosa, Calif.
*168,273. Hose coupling. The Universal Coupler Co., Philadelphia, Pa.
*168,381. Life preserver. O. A. Youngren, Sheridan, Wyo.
*168,420. Fountain pen. The L. E. Waterman Co., Limited, Montreal, Quebec, Canada, assignee of W. I. Ferris, Westfield, and E. F. Britten, Jr., Jersey City—both in New Jersey.
168,465. Fastener for overshoes. R. P. Dobson, Ravenna, Ontario, Canada.
168,479. Pneumatic tire tube. R. I. Henderson, Toronto, Ontario, Canada.
*168,523. Tire tool. M. H. Stewart, Detroit, Mich.

THE UNITED KINGDOM.

SPECIFICATIONS PUBLISHED.

The number given is that assigned to the Patent upon the filing of the application.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, MAY 17, 1916.]

1,059 (1915). Tops for cycle and like saddles made of canvas and rubber fabric. J. Jelley, 41 Spon street, Coventry.
1,128 (1915). Confectionery molds of rubber. R. C. Burger, 92 Yonge street, Toronto, Canada.
*1,175 (1915). Corset comprising strips of elastic webbing. D. Kops, 525 West End avenue, Manhattan, N. Y.
*1,176 (1915). Corset comprising strips of elastic webbing. D. Kops, 525 West End avenue, Manhattan, N. Y.
1,194 (1915). Method of inserting studs in tire treads. F. E. Blaisdell, 63 St. James' street, London.
1,236 (1915). Rubber pads for the ends of ladders. W. Thomson, 774 St. Helen's Road, Bolton, Lancashire.
1,296 (1915). Solid or cushion tire. A. H. Greenfield, 92 Earl's Court Road, London.
1,447 (1915). Inflatable life saving garment. C. E. Hartley, 61 West Dock avenue, Kingston-upon-Hull.
*100,183 (1916). Safety valve for tires. S. Kahn, 83 Court street, Newark, N. J.
100,186 (1916). Double chambered teat cups for milking machines. O. V. E. Gösling, 4 Fridhemsgatan, Stockholm.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, MAY 24, 1916.]

1,500 (1915). Electric lamp provided with a rubber washer. B. J. Grigsby, 1a Rosebery avenue, London.
*1,576 (1915). Life-saving suit having an air bag with inflating tube. O. A. Youngren and R. H. Stalcup, Sheridan, Wyo.
*1,591 (1915). Toy ship and torpedo propelled by elastic cord. W. H. Huth, 6,156 Sheridan Road, Chicago, Ill.
*1,595 (1915). Tire valves. M. C. Schweinert, 226 Palisade avenue, West Hoboken, and H. P. Kraft, 219 Godwin avenue, Ridgewood—both in New Jersey.
1,631 (1915). Means for securing rubber heels to shoes. P. Lace, 19 Parkfield Drive, Liscard, Cheshire.
1,651 (1915). Doors for storage chambers and safes made air tight by the use of rubber sheets. A. J. Roach-Cuming, 68 Cowcross street, London.
1,715 (1915). Lamp reflector and globe carrier, comprising a rubber washer. W. Sanders & Co., and W. Sanders, 7 Oxford street, Birmingham.
*1,767 (1915). Electrically equipped diving chamber with air hose attached. W. D. Sisson and J. L. Buchanan, 543 Title Insurance Building, Los Angeles, Calif.
1,817 (1915). Air tube for wheel tires. M. S. Stevenson, 41 Cheapside, London.
1,889 (1915). Military overboot having a legging continuation and a hard rubber insole. Soc. Anon. Etablissements Hutchinson, 60 Rue St. Lazare, Paris.

[ABSTRACTED IN THE ILLUSTRATED OFFICIAL JOURNAL, MAY 31, 1916.]

2,019 (1915). Engine and machine packing. G. W. Beldam, Boston Lodge, Ealing, London.
2,021 (1915). Elastic reinforced hat lining. V. L. Grosjean, 10 Rue de Paris, Compiègne, Oise, France.
2,041 (1915). Inflatable life preservers and chest and lung protectors. J. A. L. Nixon, 33 Overgate, Dundee.
2,100 (1915). Rubber cap for the mouthpiece of a pipe or holder. H. P. Simpson, 39 Victoria street, Westminster.
2,104 (1915). Inflatable life belt. T. D. MacFarlane, 515 Metropolitan Building, Vancouver, B. C.
2,155 (1915). Sponge rubber pad in machine for labeling bottles, packages, etc. P. J. Purdy, 10 Euston Buildings, George street, London.
2,156 (1915). Sponge rubber pad in machine for labeling bottles, packages, etc. P. J. Purdy, 10 Euston Buildings, George street, London.
*2,166 (1915). Rubber tires. W. H. Dane and C. de Lukacsevics, 26 Oak Crest Place, West Nutley, N. J.
2,235 (1915). Golf ball. W. Taylor, Southlea, Elms Road, Knighton, Leicester.
2,256 (1915). Rubber overshoes for use on bowling greens, etc. C. Woollett, 11a Oxton Road, Poulton, Seacombe, Cheshire.
100,212 (1916). Printing blankets. H. Hartmann, Globus, Gummi und Asbestwerke Ges., Ahrensböck, Germany.

*Denotes Patents for American Inventions.

NEW ZEALAND.

ISSUED APRIL 13, 1916.

36,368. Rubber sound-absorbing pipe for milking machines. The Ridd Milking Machine Co., Limited, Queen street, New Plymouth, N. Z.
36,891. Teat cup for milking machine. H. W. Bartram, 586-588 Bourke street, Melbourne, and A. Gillies, "Glencairn," Templestowe Road, Heidelberg—both in Victoria.
37,195. Milking machine teat cup. R. N. Pilkington, Hamilton, N. Z.

ISSUED APRIL 27, 1916.

37,278. Teat cup. G. E. Walker, Hamilton, N. Z.

THE FRENCH REPUBLIC.

PATENTS ISSUED (With Dates of Application).

478,987 (June 10, 1915). Elastic wheel. Hahle Technical Tyre Co., Limited.
478,995 (June 11). Vehicle wheel. E. P. Calvin.
479,023 (June 14). Improvements in elastic tires for motor vehicles. R. J. Wickham.
479,045 (June 16). Protector and anti-skid device for pneumatic tires. A. E. Hughes.
479,087 (June 23). Pneumatic wheel. F. Personé.
479,117 (June 26). Improvements in lateral mud-guards and splash-guards for automobile wheels and the wheels of other vehicles. H. V. N. Graveley.
479,157 (November 28, 1914). Improvements in pneumatic tires. The Helix Tube Co.
479,198 (July 6, 1915). Automobile tire. E. J. Mitchell.
479,219 (July 13). Elastic tire. J. B. Bernard.
479,223 (July 7). Elastic wheel for vehicles. C. Multhmann.
479,227 (July 6). Improvements in insulated cables for the transmission of high-tension electric currents. Beaver and Claremont.
479,256 (July 10). Device for protecting pneumatic tires, cycles and similar vehicles. J. C. Jörgensen.
479,259 (July 12). Improvements in pneumatic tires. James & Milford.

TRADE-MARKS.

THE UNITED STATES.

88,299. The B. F. Goodrich Co., New York City. Two red diamond-shaped figures located end to end circumferentially of a tire on the side of the latter. For pneumatic tires.
89,097. Gumbo Co., Asheville, N. C. Words *Gum-Bo-Chew*. For chewing gum.
92,332. The Goodyear Tire & Rubber Co., Akron, Ohio. The word *Elm*. For rubber hose.
92,333. The Goodyear Tire & Rubber Co., Akron, Ohio. The word *Elect*. For rubber hose.
92,334. The Goodyear Tire & Rubber Co., Akron, Ohio. The word *Exterminator*. For rubber hose.
92,335. The Goodyear Tire & Rubber Co., Akron, Ohio. The word *Glide*. For rubber hose.
92,336. The Goodyear Tire & Rubber Co., Akron, Ohio. The word *Ash*. For rubber hose.
92,337. The Goodyear Tire & Rubber Co., Akron, Ohio. The word *Drillwell*. For rubber surfaced fabric belting.
93,315. A. & A. Rubber Co., Framingham, Mass. A combination of *A. & A. R. Co.* and *Duxfut* within a circle. For heels, etc., made of rubber and fiber.
93,604. Lund-Mauldin Co., St. Louis, Mo. The word *Lundin*. For rubber boots, etc.
94,215. The Vanola Co., Winston-Salem, N. C. The word *Vanola*. For chewing gum.
94,299. H. C. Wilkinson, Los Angeles, Calif. The word *Reo*. For ball chewing gum.
93,217. United States Rubber Co., New Brunswick, N. J. A white bar between two blue bars of equal width. For overshoes of rubber and tennis shoes of rubber and fabric.
93,717. The Miller Rubber Co., Akron, Ohio. The words *"Confectioners' Special."* For toy balloons.
94,057. Apsley Rubber Co., Hudson, Mass. The word *Rock-Hill*. For rubber boots, overshoes, shoes and rubbers.
94,778. Sucs. de Jose Martinez S. en C., San Juan, Porto Rico. The words *Our Regard*. For rubber shoes, etc.

91,022. The Scholl Manufacturing Co., Chicago, Ill. A heavy line ellipse broken away at one portion. For dental, medical and surgical appliances.

92,749. The Goodyear Tire & Rubber Co., Akron, Ohio. A blue streak is displayed upon the outer face of the hose and extending longitudinally thereof, and the words *Blue Streak* printed in block letters on the outer face of the hose. For rubber hose.

93,396. Panama Rubber & Equipment Co., St. Louis, Mo. The word *Pareco*. For automobile tire filler.

94,294. S. A. & H. Myers, Boston, Mass. *The S. A. & H. M Rain Check* illustrated within a square. For raincoats.

94,300. Wright & Ditson, Jersey City, N. J., and Boston, Mass. The word *Birdie*. For golf balls.

94,301. Wright & Ditson, Jersey City, N. J., and Boston, Mass. The word *Bisk*. For golf balls.

94,344. John Wanamaker, New York City. The words *Blue Flash*. For golf balls.

94,516. Schmelzer Arms Co., Kansas City, Mo. The word *Kilty*. For golf balls.

86,499. George Benton Wood, Duluth, Minn. The representation of a pneumatic tire with the word *Woods* illustrated on one half of center and the words *Locktite* and *Patch* on tire. For inner tube and casing patches for vehicle tires.

90,126. The Miller Rubber Co., Akron, Ohio. The word *C-Kure-Nek*. For hot water bottles, etc.

90,942. Seneca G. Lewis, Greensburg, Pa. The words *Lewis* and *No Jar*. For rubber supports for time-pieces.

93,467. New Jersey Car Spring & Rubber Co., Jersey City, N. J. The word *Carspring*. For rubber hose, packing and tires.

93,875. Michigan Waterproofing Co., Grand Rapids, Mich. The word *Itshure*. For rubber dressing and preservative, etc.

94,175. Reid Bros., Seattle, Wash., and San Francisco, Calif. An illustration of a walrus head and the words *Walrus Sheeting* within a circle. For waterproofed hospital sheeting.

90,911. The Standard Tire & Rubber Manufacturing Co., Cleveland, Ohio. A design of a wreath with an eagle standing on top of the letter *S* in the center. For rubber and fabric tires and tubes.

92,291. Geo. E. Keith Stores Co., Brockton, Mass. The word *Gekco*. For boots and shoes of rubber and other fabric construction.

94,386. The Mechanical Rubber Co., Jersey City, N. J. The word *Hyd-Rex*. For machinery packing composed of rubber or rubber and fabric.

94,405. The Worthington Ball Co., Elyria, Ohio. The word *Arrow*. For golf balls.

94,406. The Worthington Ball Co., Elyria, Ohio. The word *Four*. For golf balls.

94,831. Robinson-Roders Co., Newark, N. J. An illustration of a life preserver with the word *Universal* on the outer edge and in the center a man riding the waves on an air mattress.

94,960. H. Malkin, Brooklyn, N. Y. The words *Baby Grand*. For shoes made of rubber, etc.

THE UNITED KINGDOM.

370,701. The word CONQUEROR—insulating materials, packings, machine belting, brushes (except artists' brushes and brushes of metal). United States Rubber Co., Limited, London.

370,732. The word SYLLAN—preparation for waterproofing and preserving leather and leather goods. Samuel Cairns McNally, Glasgow.

370,876. The word LACTOLITH—a material made from animal substances. The British Casein Co., Limited, London.

370,922. The word REGO—india rubber revolving heels. Samuel Gnivisch & Sons, London.

370,945. The word NOXALITE—asbestos sheeting and washers made therefrom. J. B. Auto Specialties Co., Limited, Croydon, Surrey.

372,090. The word ROHOLKER—water bottles and air and water beds, cushions and pillows made of rubber. Sangers, London.

371,177. The word PRESTOLITE—accumulator boxes of non-inflammable material for railway carriages and other vehicles. British Electrical & Manufacturing Co., Limited, Newcastle-upon-Tyne.

371,236. The word PLUVEX—showerproof garments. McDonalds, Limited, Glasgow.

371,279. The word CLINCHER—all goods included in Class 8 of British Trade-marks. The North British Rubber Co., Limited, Edinburgh.

371,282. The word LATOCAL—material made from an animal substance. Henry Charles Dutton, Richmond.

371,341. The word IVOID—material made from casein. Erinoid, Limited, London.

371,342. The word KEVOID—material made from casein. Erinoid, Limited, London.

371,343. The word IROID—material made from casein. Erinoid, Limited, London.

371,372. The word ROSCOLITE—artificial leather. Rosendale Rubber Co., Limited, Manchester.

371,376. The word NYCKELMARKET surmounting a key—rubber insulated electrical cables. Callender's Cable & Construction Co., Limited, London.

371,397. The word AQUATITE—air and water beds, cushions and pillows, water bottles, sheeting, cloth covers, foot-warmers, bottle stoppers and bags not for surgical or curative purposes. Thomas Rowe, Leytonstone.

371,413. The word PROVOT—electrical insulating compound. Oliver Mathews Row, Flixton.

371,414. The word PETRAX—brake blocks made of rubber and canvas, canvas predominating. W. Petrie & Co., Limited, London.

371,474. A trade-mark the essential feature of which is the arrangement of scales and the figures and words *6* AND *30* and SIX AND THIRTY—hose of all kinds. North British Rubber Co., Limited, Edinburgh.

*371,492. The word PARALOID—sanitary sheeting. The I. B. Kleinert Rubber Co., New York City.

371,529. The word SMADA—elastic hose supports and elastic arm bands. W. Y. Adams & Co., Manchester.

371,530. The word SMADA—elastic cords, braids and webs and elastic corset laces. W. T. Adams & Co., Manchester.

371,535. The word MERVEA—caoutchouc. Matthieu Gérard Jacques Marie Kerbosch. Tjinjiroean, near Bandoeng, Isle of Java, Netherlands East Indies.

371,574. The words SILVER KING—golf balls. The India-Rubber, Gutta-Percha & Telegraph Works, Limited, London.

371,605. The words BED and TREE and the letter P combined in a design of a person reclining on a bed, enclosed in a double ring—water beds and air beds of rubber and fabric. W. Petrie & Co., Limited, London.

371,615. The word CLINCHER—interchangeable wheels and wheel rims, ordinary wheel rims for automobiles, tire valves, tire tools and like accessories for use in connection with rubber vehicle tires. The North British Rubber Co., Limited, Edinburgh.

*371,822. The word NEOLIN—goods manufactured from india rubber and gutta percha. The Goodyear Tire & Rubber Co., Akron, Ohio.

371,840. A fan with the words PUNKAH and BRAND—rubber goods other than dress shields. H. B. Sleeman & Co., Limited, London.

371,857. The word CORWARD—capes. F. C. Cording & Co., Limited, London.

371,952. The word FORUM—balata machine belting. Mine Lubricants, Limited, London.

372,136. The word WACOLDITE—packings, jointings and hose. Wooding & Cory, Limited, London.

372,309. The word PLUVEX—material for tightening and packing purposes; material for electrical insulating purposes; roofing material (pasteboard) and roofing felt. The Rubberoid Co., London.

372,667. The word BOLMAT—air bed made of india rubber or gutta percha, or in which such materials predominate. Thresher & Glenny, London.

DESIGNS.

THE UNITED STATES.

49,090. Toy balloon. T. M. Gregory, Akron, Ohio.

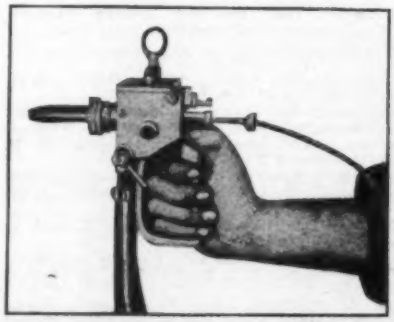
49,121. Automobile tire. R. Iredell, assignor to The General Tire & Rubber Co.—both of Akron, Ohio.

49,187. Vehicle tire. C. H. Knight, Canton, Ohio.

*Denotes trade-marks owned by American Companies.

METAL SPRAY PISTOL.

For many purposes it has been found desirable to deposit a thin plating or coating of non-corrosive metal upon other more vulnerable metals, or on objects made of non-metallic substances.



Such plating is usually done by electro-deposition. This process is not possible in all cases, and a recent invention is a hand tool, which places a metallic coating of any required thickness upon any surface or spot desired. The tool is somewhat in the form of a pistol, and is handled in a similar manner. It is, to all intents and purposes, an atomizer of melted metal.

The metal, in the form of a thin wire, is fed into a reducing flame zone where the end is melted, a drop at a time, and each drop is struck a blow at the instant of formation, thus causing it to be ejected in the form of a molten spray. In order that this pistol may be aimed at any angle, a flexible connection is necessary between the supply of oxygen, hydrogen and air, and the pistol. This is accomplished by lines of rubber hose, made to withstand 40 pounds pressure. The device is the invention of M. C. Schoop, an engineer of Zurich, Switzerland.

Review of the Crude Rubber Market.

NEW YORK.

THE crude rubber market for the past month has been extremely quiet, with very little business other than occasional small orders for the purpose of trying out the market, and desultory trading among the local dealers. This is the quiet season when the mills usually commence to slow down for taking inventory or making necessary repairs and additions to equipment, therefore, unless something unusual happens, the large buyers have no reason to be interested in the present market.

Early in the month the reported heavy buying of futures, running into 1917, and the activity of London had a strengthening effect on the local market, resulting in firm prices. On June 1, First latex, spot and nearby, were selling for 66@66½ cents, with July-December at the same figures, and future positions during 1917 were quoted 62½ cents. Smoked sheet ribbed, spot and nearby were 65 cents; July-December 65@65½ cents, and futures for 1917 were quoted 61½ cents. Upriver fine was steady at 65 cents, and July-August deliveries were quoted at the same figures.

Extreme dullness continued to rule the local market as the month progressed and prices continued to decline to such an extent that on June 15, Upriver fine was selling at 2 cents premium over First latex. Toward the end of the month these unusual conditions, accompanied by steadily declining prices, had developed a most unsettled tone to the local market. On June 28, however, Upriver fine, spot and nearby developed considerable activity due to speculative interests coming into the market, and running the price of Upriver fine up to 67 cents. July-December was firm at 64 cents. The other Para sorts, however, are normal. On the same day First latex, spot and nearby were selling at 61 cents, with July-December at the same figures. Smoke sheet ribbed, spot and nearby, were 59½@60 cents, and July-December at the same figures. All future positions for 1917 were selling at spot quotations.

New York arrivals for the first three weeks of June are approximately 5,635 tons, as compared to 6,756 tons for the same period last month, and are as follows: Plantations from London, 2,535 tons; Singapore, 1,855 tons; Para rubber from Brazil, 645 tons; from Europe, 60 tons; Centrals, 80 tons; Guayule, 180 tons; Africans, 185 tons; Manicoba, 95 tons.

LONDON.

June opened with declining values, that continued to fall with few unimportant rallies throughout the month. June 1, Standard crepe was 62.3 cents; Smoked sheet, 60.8 cents, and Hard fine, 64.8 cents. The sensitiveness that has featured the June market has continued up to the present writing and both buyers and sellers are apparently unwilling to try the strength of the position.

The supply of crude rubber is undoubtedly unwieldy. America's demands have evidently quieted down for a time and the situation is very much like a ship in the doldrums,—something may happen at any time. On June 28, Standard crepe was 57 cents, Smoked sheet 56½ cents and Hard fine 64 cents.

SINGAPORE.

There were 1,302 tons sold at the four auctions held between May 31 and June 21 inclusive. The average price being 57.2 cents for crepe and 55.9 cents for Smoked sheet.

The following are the new freight rates from Singapore to Boston and New York via the Suez or Panama Canal:

Rubber scrap (cases)	$36.00 per 50 cubic feet
Gutta jelutong (cases) (Pontianak)	39.60 per 50 cwt.
Rubber shavings, not exceeding $300 per ton (cases)	39.60 per 50 cubic feet
Gutta re-boiled or mixed, not exceeding 24 cents per pound (c. i. f. in cases)	40.80 per 50 cubic feet
Borneo rubber (baskets)	48.00 per 12 cwt.
Borneo, Pará, and rubber, genuine (cases)	48.00 per 50 cubic feet
Gutta percha (cases)	50.40 per 50 cubic feet
Rubber, genuine (bags or bundles)	72.00 per 20 cwt.

The new through rate on rubber in cases from Port Swettenham, Malacca, Teluk Anson, Port Dickson, is $51.60 per 50 cubic feet. In cases by steamers calling at Port Swettenham is $48 per 50 cubic feet. [The equivalent of a ton (2,240 pounds) is figured at 40 cubic feet, a hundred weight (cwt.) 112 pounds.]

NEW YORK QUOTATIONS.

Following are the quotations at New York one year ago, one month ago, and June 29, the current date:

PARA.	July 1, 1915.	June 1, 1916.	June 29, 1916.
Upriver, fine, new	62½@63	66 @	65 @66
Upriver, fine, old	63 @65	.....	.....
Islands, fine, new	53½@54	60 @	57 @
Islands, fine, old	55 @57	.....	.....
Upriver, coarse, new	45½@46	49 @	41½@42
Upriver, coarse, old	.....	.....	.....
Islands, coarse, new	28½@29	30 @	26 @
Islands, coarse, old	.....	.....	.....
Cametá	31½@32	34½@	32 @
Caucho, ball, upper	46 @46½	49 @	42 @
Caucho, ball, lower	43 @44	45 @	40 @
PLANTATION.			
First latex crêpe	Spot.. 63 @ / Afloat 62½@63	Spot..... 66½@67½ / July-Dec. 67 @	Spot... 60 @ / Futures 60 @
Amber crêpe, light	.....	Spot..... 64 @65½ / July-Dec. 64 @	Spot... 58½@ / Futures 58½@
Brown crêpe, clean	.....	Spot..... 62 @63½ / July-Dec. 62 @63	Spot... 56½@ / Futures 56½@
Smoked sheet, ribbed	Spot.. 63 @ / Afloat 62½@63	Spot..... 66 @ / July-Dec. 65 @67	Spot... 59 @ / Futures 59 @
Fine sheets and biscuits, unsmoked	60 @61	.....	.....
CENTRALS.			
Corinto	44 @45	42 @43	40 @
Esmeralda, sausage	44 @45	41 @42	40 @
Nicaragua, scrap	.....	40 @41	40 @
Mexican plantation, sheet	.....	42 @43	.....
Mexican, scrap	44 @	39 @42	39 @
Mexican, slab	.....	36 @37	32 @
Manicoba	37 @38	44 @46½	42½@
Mangabeira, sheet	38 @39	39 @	40 @
Guayule	32 @34	38 @39	36 @
Balata, sheet	53 @56	70 @70½	74 @
Balata, block	45 @47	.....	55 @
AFRICAN.			
Lopori, ball, prime	54 @56	64 @	38 @
Lopori, strip, prime	.....	.....	.....
Upper Congo, ball, red	.....	62 @	54 @55
Rio Nunez Niggers	55 @56	63 @	54 @
Conakry Niggers	54 @	61 @62	50 @52
Massai, red	53 @54	59 @	56 @
Soudan, Niggers	.....	.....	48 @52
Cameroon, ball, soft	.....	.....	44 @51
Cameroon, ball, hard	.....	.....	.....
Benguela, No. 1	32½@33	44 @	42 @
Benguela, No. 2	.....	39 @	35 @
Accra, flake	23 @	35 @	28 @
EAST INDIAN.			
Assam	48½@49	44 @	.....
Pontianak	7 @ 7½	7¾@	8¼@
Gutta Siak	14 @14½	25 @	14¼@
Gutta red Niger	.....	25 @	23 @
Borneo III	.....	.....	18 @20
Gutta Percha	.....	1.50 @2.50	1.50 @2.50

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crêpe. Price per lb.	Smoked Sheet. Price per lb.	Pounds Sold.	Market.
May 31... *cents*	58.6	56.5	660,800	Active at lower prices.
June 7.....	59.5	58.6	600,320	Active, good demand.
June 16.....	55.2	54.8	672,000	Weaker.
June 21.....	55.6	53.9	672,000	Active at lower prices.
June 28.....	52.2	51.0	728,000	Active at lower prices.

COMPARATIVE NEW YORK PRICES FOR JUNE.

The demand for Commercial Paper continues good, though not quite as large the latter part of June as it has been for some months past, and the best rubber names have sold during this month at 4@4½ per cent, and those not so well known 5@5½ per cent.

	1916.*	1915.	1914.
Upriver, fine	$0.62@0.68	$0.61@0.63	$0.69@0.71
Upriver, coarse	.42@ .50	.45@ .47	.40@ .42
Islands, fine	.57@ .62	.52@ .55	.58@ .62
Islands, coarse	.27@ .31	.29@ .31	.27@ .29
Cametá	.33@ .35	.31@ .33	.31@ .34

*Figured only to June 26.

SINGAPORE.

GUTHRIE & CO., LIMITED, report [May 10, 1916]:

Prices realized at the auction held today show a further decline, but are satisfactory when compared with London values. Standard sheet is $13 lower at $149, but standard crêpe is only $2 lower than last week's best. Demand was good for the latter grade, and most parcels found buyers. Out of a total of 454 tons cataloged 168 tons were sold.

The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.†
Sheet, fine ribbed smoked	$140@149	2/ 8½@2/10¼	66.64@70.44
Sheet, good ribbed smoked	135@140	2/ 7½@2/ 8½	64.10@66.64
Sheet, plain smoked	135@138	2/ 7½@2/ 8½	64.10@65.88
Sheet, ribbed unsmoked	137@ —	2/ 8½@ ——	65.37@ ——
Sheet, plain unsmoked	117@135	2/ 4 @2/ 7½	56.76@64.10
Crêpe, fine pale	150@159	2/11 @3/ 0⅛	70.95@74.75
Crêpe, good pale	139@150	2/ 8½@2/11	66.13@70.95
Crêpe, fine brown	125@133	2/ 5¾@2/ 7½	60.31@63.60
Crêpe, good brown	115@129	2/ 3½@2/ 6⅜	56.00@62.08
Crêpe, dark	107@125	2/ 2 @2/ 5¼	52.70@60.31
Crêpe, bark	75@110	1/ 7½@2/ 2⅝	39.02@53.97
Scrap, virgin	83@ 90	1/ 9 @1/10⅜	42.57@45.35
Scrap, pressed	83@ —	1/ 9 @ ——	42.57@ ——
Scrap, loose	60@ 82	1/ 4⅛@1/ 8¼	32.68@42.06

*Picul = 133⅓ pounds.
†Figured at standard rate of exchange, 1*s.* = 24.3 cents.
Quoted in S. S. dollars = 2/4 [56.7 cents].

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

[The Figures Indicate Weights in Pounds.]

MAY 18.—By the steamer *Acre* from Pará and Manáos:

	Fine.	Medium.	Coarse.	Caucho.	Total.
Meyer & Brown	106,700	18,400	124,100	66,300=	315,500
Arnold & Zeiss	79,400	5,300	76,200	500=	152,400
General Rubber Co.	48,200	7,700	3,000	22,000=	80,900
A. D. Straus & Co.	52,000	.....	7,600	1,900=	61,500
G. Amsinck & Co.	30,700	3,600	27,300	46,400=	108,000
Birdsong Bros.	5,400	9,500	18,600	12,300=	45,800
H. A. Astlett & Co.	2,000	.....	5,100	19,500=	26,600
Henderson & Korn	.....	5,900	13,000	1,100=	20,000
H. C. Kupper	.....	.....	.....	14,700=	14,700
Muller, Schall & Co	7,900	.....	200	100=	8,200
Aldens' Successors, Ltd.	150	3,800	3,300	1,000=	8,250
Henderson & Korn	22,300	5,700	6,400	32,600=	67,000
Robinson & Co.	6,700	.....	.....	.....=	6,700
Totals	352,450	59,900	284,800	218,400=	915,550

MAY 31.—By the steamer *Francis* from Pará and Manáos:

Meyer & Brown	37,100	17,700	29,800	20,600=	105,200
Pell & Dumont	3,800	600	55,800	45,500=	105,700
General Rubber Co.	66,100	7,600	20,100	4,900=	98,700
Arnold & Zeiss	16,800	2,000	16,000	53,200=	88,000
H. A. Astlett & Co.	16,700	17,000	16,000	31,700=	81,400
Henderson & Korn	25,800	4,200	2,700	.....=	32,700
Paul Bertuch	23,000	.....	1,500	.....=	24,500
Robinson & Co.	2,000	.....	9,700	.....=	11,700
Aldens' Successors, Ltd.	300	2,200	5,200	200=	7,900
F. B. Ross & Co.	.....	.....	7,500	.....=	7,500
W. R. Grace & Co.	4,300	400	.....	.....=	4,700
Totals	195,900	51,700	164,300	156,100=	568,000

MAY 31.—By the steamer *Gregory* from Iquitos:

Chartered Bank of Spanish America	700	.....	800	50,300=	51,800
W. R. Grace & Co.	3,200	.....	2,200	40,200=	45,600
G. Amsinck & Co.	2,400	.....	2,100	37,500=	42,000
H. C. Kupper	2,600	.....	3,600	15,600=	21,800
H. A. Astlett & Co.	4,700	.....	.....	11,800=	16,500
Toledano Exporting Co.	.....	.....	300	3,300=	3,600
Totals	13,600	.....	9,000	158,700=	181,300

JUNE 14.—By the steamer *Justin* from Pará and Manáos:

Meyer & Brown	70,800	10,600	70,100	1,400=	152,900
Paul Bertuch	295,700	24,900	64,400	121,600=	506,600
Arnold & Zeiss	56,700	8,500	63,700	32,600=	161,500
W. R. Grace & Co.	56,800	2,800	21,800	79,300=	160,700
General Rubber Co.	48,100	3,600	7,400	.....=	64,100
Henderson & Korn	36,200	4,000	15,700	700=	56,600
H. A. Astlett & Co.	9,600	6,800	22,600	9,100=	48,100
J. T. Johnstone & Co.	.....	.....	.....	43,000=	43,000
Pell & Dumont	19,800	.....	6,000	11,000=	36,800
Robinson & Co.	200	.....	24,500	800=	25,500
G. Amsinck & Co.	5,400	400	9,100	.....=	14,900
Rumsey & Greutert, Inc.	10,200	.....	.....	.....=	10,200
Aldens' Successors, Ltd.	700	300	2,900	200=	4,100
Totals	610,200	66,900	208,200	299,700=	1,285,000

JUNE 5.—By the steamer *Tapajos* from Pará and Manáos:

Meyer & Brown	14,300	700	88,100	9,500=	112,600
Paul Bertuch	391,000	6,600	12,400	179,300=	589,300
Crossman & Sielcken	195,400	28,100	67,300	102,500=	393,300
Arnold & Zeiss	59,800	5,900	75,200	1,200=	142,100
General Rubber Co.	94,500	8,900	7,200	14,300=	124,900
H. C. Kupper	56,400	7,200	19,500	21,500=	104,600
Neuss, Hesslein & Co.	49,700	.....	10,800	5,200=	65,700
Henderson & Korn	23,300	5,700	30,600	2,500=	62,100
G. Amsinck & Co.	24,700	700	10,800	13,800=	50,000
H. A. Astlett & Co.	6,800	400	15,900	17,200=	40,300
F. D. Duerr & Co.	22,500	.....	900	15,400=	38,800
J. T. Johnstone & Co.	.....	.....	.....	16,000=	16,000
Muller, Schall & Co.	3,600	.....	4,300	4,000=	11,900
Birdsong Bros.	500	.....	5,600	800=	6,900
Guaranty Trust Co.	35,600	.....	11,300	.....=	46,900
Guaranty Trust Co.	14,800	.....	3,800	2,900=	21,500
Various	33,900	3,400	8,100	.....=	45,400
Totals	1,026,800	67,600	371,800	406,100=	1,872,300

PARAS.

		Pounds.
MAY 29.—By the *Advance*=Colon:		
G. Amsinck & Co. (Fine)	6,000	
G. Amsinck & Co. (Coarse)	1,500	
Neuss, Hesslein & Co. (Fine)	12,500	
Neuss, Hesslein & Co. (Coarse)	2,000	22,000
JUNE 5.—By the *Oregonian*=Buenos Aires:		
Muller, Schall & Co. (Fine)	72,000	
Muller, Schall & Co. (Coarse)	5,000	77,000
JUNE 8.—By the *Panama*=Colon:		
G. Amsinck & Co.		1,500
JUNE 17.—By the *Caracas*=Puerto Cabello:		
General Export & Commission Co. (Fine)	30,000	
General Export & Commission Co. (Coarse)	10,000	40,000

CENTRALS.

[*This sign, in connection with imports of Centrals, denotes Guayule rubber.]

		Pounds.
MAY 23.—By the *Calamares*=Port Limon:		
Isaac Brandon & Bros.		1,000
MAY 23.—By the *El Oriente*=Galveston:		
Various		*56,000
MAY 27.—By the *Siracla*=Cortez:		
Eggers & Heinlein	500	
G. Amsinck & Co.	200	700
MAY 29.—By the *Esperanza*=Mexico:		
J. A. Medina & Co.	9,000	
G. Schaumann & Co.	9,000	
American Trading Co.	3,000	
H. Marquardt & Co.	2,500	
Harburger & Stack	500	24,000
MAY 31.—By the *Tenadores*=Port Limon:		
A. A. Linde & Co.		1,000
JUNE 2.—By the *Cristobal*=Colon:		
G. Amsinck & Co.	15,000	
A. M. Capen's Sons	11,600	
Mecke & Co.	8,200	
Pablo, Calvet & Co.	5,100	
H. Mann & Co.	2,800	
Piza, Nephews & Co.	2,000	
Pottberg, Ebeling & Co.	2,600	
J. S. Sembrada & Co.	1,800	
Gontard & Co.	1,300	
H. Wolff & Co.	1,000	
Fidanque Bros. & Co.	500	
Isaac Brandon & Bros.	500	58,400
JUNE 3.—By the *Santa Marta*=Cartagena:		
Pottberg, Ebeling & Co.	3,000	
Mecke & Co.	1,500	
Muller, Schall & Co.	900	5,400

		POUNDS.
JUNE 7.—By the *Metapan*=Port Limon:		
Isaac Brandon & Bros.	2,000	
Suzarte & Whitney	3,000	
De Lima, Cortissoz & Co.	1,000	6,000
JUNE 7.—By the *El Sud*=Galveston:		
Various		*30,000
JUNE 8.—By the *El Norte*=Galveston:		
Various		*75,000
JUNE 8.—By the *Panama*=Colon:		
G. Amsinck & Co.	2,300	
Muller, Schall & Co.	1,400	
Lawrence Johnson & Co.	2,800	
Andean Trading Co.	1,900	
Isaac Brandon & Bros.	400	
Dumarest Bros.	700	
Fidanque Bros. & Co.	2,000	
Pottberg, Ebeling & Co.	200	11,700
JUNE 9.—By the *Almirante*=Cartagena:		
A. Held	4,000	
Andean Trading Co.	1,200	
G. Amsinck & Co.	300	5,500
JUNE 12.—By the *Tivives*=Cortez:		
G. Amsinck & Co.	300	
Eggers & Heinlein	200	500
JUNE 12.—By the *Monterey*=Mexico:		
E. Steiger & Co.	27,000	
J. A. Medina & Co.	4,000	
Graham, Hinckley & Co.	1,000	
General Export & Commission Co.	200	
Thurston & Braidich	3,000	
H. W. Catlin	1,000	
Pedro Tremari, Successor	500	
W. A. Ans & Co.	1,000	
C. C. Mengel Bros.	200	37,900
JUNE 13.—By the *Pastores*=Port Limon:		
H. Marquardt & Co.	2,500	
Fruit Dispatch Co.	1,500	
Isaac Brandon & Bros.	1,500	5,500
JUNE 15.—By the *Zacapa*=Cartagena:		
G. Amsinck & Co.	6,000	
American Trading Co.	1,500	
H. Wolff & Co.	500	8,000
JUNE 16.—By the *El Cid*=Galveston:		
Various		*200,000
JUNE 19.—By the *Norden*=Mexico:		
W. R. Grace & Co.	17,000	
Harburger & Stack	5,000	
G. Amsinck & Co.	1,000	
Graham, Hinckley & Co.	1,000	24,000
JUNE 20.—By the *Calamares*=Port Limon:		
A. A. Linde & Co.	1,000	
Suzarte & Whitney	1,000	
Isaac Brandon & Bros.	500	2,500

AFRICANS.

MAY 31.—By the *Orduna*=Liverpool:		
Arnold & Zeiss	11,200	
H. A. Astlett & Co.	7,000	
General Rubber Co.	6,000	
Rubber Trading Co.	2,240	26,440
JUNE 1.—By the *Chicago*=Bordeaux:		
Robert Badenhop Co.		30,000
JUNE 2.—By the *Celtic*=Liverpool:		
Edward Maurer & Co., Inc.		6,000
JUNE 3.—By the *Ardgryfe*=London:		
J. T. Johnstone & Co.		7,000
JUNE 12.—By the *Valeria*=Liverpool:		
Goodyear Tire & Rubber Co.	60,000	
Edward Maurer & Co., Inc.	100,000	160,000
JUNE 12.—By the *Buffalo*=Hull:		
J. T. Johnstone & Co.		45,000
JUNE 19.—By the *Montebello*=Hull:		
Arnold & Zeiss		7,500
JUNE 19.—By the *Quebra*=Liverpool:		
Goodyear Tire & Rubber Co.	78,000	
Edward Maurer & Co., Inc.	40,000	118,000
JUNE 20.—By the *Penistone*=Havre:		
Robert Badenhop Co.		2,200

MANICOBA.

JUNE 9.—By the *Cavour*=Bahia:		
Adolph Hirsch & Co.		52,000
JUNE 14.—By the *Justin*=Parnahyba:		
Rossbach Bros. & Co.		40,000
JUNE 14.—By the *Justin*=Pernambuco:		
Rossbach Bros. & Co.		55,000
JUNE 14.—By the *Justin*=Ceara:		
Rossbach Bros. & Co.	12,500	
F. B. Ross & Co.	6,000	18,500
JUNE 19.—By the *Rio de Janeiro*=Bahia:		
Adolph Hirsch & Co.		18,500
JUNE 19.—By the *Rio de Janeiro*=Pernambuco:		
Lawrence Johnson & Co.		5,500

PLANTATIONS.

MAY 24.—By the *Minnehaha*=London:		
Meyer & Brown	70,000	
Edward Maurer & Co., Inc.	70,000	
F. Stern & Co.	33,500	
Raw Products Co.	25,000	
General Rubber Co.	380,000	578,500
MAY 26.—By the *Boveric*=Colombo:		
Meyer & Brown	131,000	
L. Littlejohn & Co.	162,600	
Goodyear Tire & Rubber Co.	22,500	
J. T. Johnstone & Co.	23,000	
Henderson & Korn	27,000	
Arnold & Zeiss	30,000	
Edward Maurer & Co., Inc.	9,000	405,100
MAY 26.—By the *Santa Rosalia*=Colombo:		
Meyer & Brown	103,000	
L. Littlejohn & Co.	134,200	
Goodyear Tire & Rubber Co.	28,000	
J. T. Johnstone & Co.	34,000	
Henderson & Korn	25,000	324,200
MAY 29.—By the *Indrasamha*=Singapore:		
Meyer & Brown	13,500	
Edward Maurer & Co., Inc.	7,000	
F. Stern & Co.	4,500	
Charles T. Wilson Co., Inc.	3,500	
Aldens' Successors, Ltd.	94,000	
Henderson & Korn	42,000	
Goodyear Tire & Rubber Co.	17,000	
Arnold & Zeiss	4,500	
F. B. Ross & Co.	11,200	
J. T. Johnstone & Co.	182,000	
L. Littlejohn & Co.	235,753	614,953
MAY 31.—By the *Orduna*=Liverpool:		
Arnold & Zeiss		12,500
MAY 31.—By the *Mongolia*=London:		
General Rubber Co.	340,000	
Goodyear Tire & Rubber Co.	112,000	
Edward Maurer & Co., Inc.	45,000	
L. Littlejohn & Co.	189,334	686,334
JUNE 1.—By the *St. Patrick*=Singapore:		
Meyer & Brown	25,000	
Edward Maurer & Co., Inc.	45,000	
Boston Insulated Wire & Cable Co.	4,500	
L. Littlejohn & Co.	254,664	
Arnold & Zeiss	110,000	
W. R. Grace & Co.	45,000	
Robert Badenhop Co.	17,000	
Charles T. Wilson Co., Inc.	27,000	
Goodyear Tire & Rubber Co.	32,000	
Hood Rubber Co.	4,500	
J. T. Johnstone & Co.	138,000	702,664
JUNE 3.—By the *Ardgryfe*=London:		
Meyer & Brown	165,000	
Edward Maurer & Co., Inc.	22,500	
W. H. Stiles & Co.	22,500	
The B. F. Goodrich Co.	245,000	
Aldens' Successors, Ltd.	236,400	
J. T. Johnstone & Co.	183,000	
L. Littlejohn & Co.	64,447	
Michelin Tire Co.	45,000	
Charles T. Wilson Co., Inc.	70,000	
Henderson & Korn	35,000	
Robinson & Co.	25,000	1,113,847
JUNE 6.—By the *Ardgorm*=London:		
J. T. Johnstone & Co.		22,500
JUNE 8.—By the *Egremont Castle*=Singapore:		
Meyer & Brown	47,000	
Arnold & Zeiss	20,000	
Edward Maurer & Co., Inc.	52,000	
Charles T. Wilson Co., Inc.	36,000	
Fox & Co.	45,000	
Raw Products Co.	7,000	
Aldens' Successors, Ltd.	23,400	
F. B. Ross & Co.	11,200	
Rubber Trading Co.	40,320	
Henderson & Korn	33,500	
Goodyear Tire & Rubber Co.	185,000	
J. T. Johnstone & Co.	259,000	
L. Littlejohn & Co.	177,208	
Robinson & Co.	22,500	
Various	33,500	992,628
JUNE 9.—By the *Siberia*=London:		
General Rubber Co.	290,000	
L. Littlejohn & Co.	98,646	
Charles T. Wilson Co., Inc.	100,000	488,646
JUNE 9.—By the *Headley*=London:		
Meyer & Brown	70,000	
Edward Maurer & Co., Inc.	33,500	
W. H. Stiles & Co.	30,000	
General Rubber Co.	265,000	
The B. F. Goodrich Co.	200,000	
Aldens' Successors, Ltd.	225,000	
Arnold & Zeiss	170,000	
J. T. Johnstone & Co.	158,000	
Rubber Trading Co.	10,080	
Charles T. Wilson Co., Inc.	22,500	
Robinson & Co.	13,500	1,197,580
JUNE 12.—By the *Valeria*=Liverpool:		
General Rubber Co.		6,000
JUNE 15.—By the *Minnesota*=London:		
Henderson & Korn	11,200	
L. Littlejohn & Co.	22,285	
F. Stern & Co.	50,000	83,485
JUNE 16.—By the *Indraghiri*=Singapore:		
Meyer & Brown	35,000	
Edward Maurer & Co., Inc.	80,000	
General Rubber Co.	585,000	
Aldens' Successors, Ltd.	45,800	
H. R. Jefferds	14,000	
Charles T. Wilson Co., Inc.	112,000	
Arnold & Zeiss	22,500	
Fox & Co.	27,000	
Robinson & Co.	1,100	
Rubber Trading Co.	40,320	
Henderson & Korn	290,000	
Goodyear Tire & Rubber Co.	360,000	
J. T. Johnstone & Co.	249,000	
L. Littlejohn & Co.	215,339	2,017,059
JUNE 19.—By the *St. Louis*=Liverpool:		
Charles T. Wilson Co., Inc.		4,500
JUNE 19.—By the *Pannonia*=London:		
Meyer & Brown	135,000	
Edward Maurer & Co., Inc.	22,500	
W. H. Stiles & Co.	22,500	
The B. F. Goodrich Co.	725,000	
General Rubber Co.	290,000	
Aldens' Successors, Ltd.	268,600	
J. T. Johnstone & Co.	361,000	
Arnold & Zeiss	100,000	
Michelin Tire Co.	80,000	
Charles T. Wilson Co., Inc.	80,000	
Raw Products Co.	18,000	
L. Littlejohn & Co.	37,207	
Robinson & Co.	9,000	2,148,807

CRUDE RUBBER ARRIVALS AT SEATTLE.

[The Figures Indicate Weights in Pounds.]

**Figured 130 pounds net to the case.*

PLANTATION.

TO AKRON.

MAY 26.—By the steamer *Talthybius*. Consignee—	
Firestone Tire & Rubber Co.	
The Waterhouse Co.	206,700
J. T. Johnstone & Co.	
Hevea Johore Rubber Plantation	5,460
Goodyear Tire & Rubber Co.	
Harrisons & Crosfield	224,510
Anglo Malay Rubber Co.	56,030
Guthrie & Co.	24,180
Duff Development Co.	15,860
Rubber Estates of Johore	11,410
Anglo Sumatra Rubber Co.	5,330
Tamiang Rubber Estates Co.	3,380
United Serdang Rubber Plantation	3,250
Bandar Sumatra Rubber Co.	2,080
Serdang Central Plantation, Ltd.	2,080 560,270

TO NEW YORK.

United States Rubber Co.	
General Rubber Co.	386,230
Aldens' Successors, Ltd.	
G. H. Slot & Co.	8,320
Charles T. Wilson Co., Inc.	
Insulinde Rubber and Tobacco Estate	3,120
J. T. Johnstone & Co.	
Duff Development Co.	8,580
Anglo Sumatra Rubber Co.	2,860
Henderson & Korn.	
United Serdang Rubber Plantation	1,690
Arnold & Zeiss.	
Weller & Co.	307,710
C. W. Mackie & Co.	31,850
United Serdang Rubber Plantation	4,290
W. Mansfield & Co.	4,160
Tandjong Rubber Co., Ltd.	2,730
Edward Maurer Co., Inc.	
C. W. Mackie & Co.	47,060

	Pounds.	
W. R. Grace & Co.		
Guthrie & Co.	43,550	
Fox & Co.		
Weller & Co.	21,190	
L. Littlejohn & Co.		
United Serdang Rubber Plantation	7,930	
Arthur Meyer & Co.		
Insulinde Rubber & Tobacco Estate	3,120	884,390
TO SEATTLE.		
The B. F. Goodrich Co.		
W. T. Easley	228,670	
Adamson, Gelfellow & Co.	79,950	
Goodyear Tire & Rubber Co.		
C. W. Mackie & Co.	168,350	
Sungei Pureen Rubber Co.	6,240	
Planters Stores & Agency Estate	4,420	
Cheras Rubber Estate	3,770	
W. R. Grace & Co.		
Guthrie & Co.	22,100	
R. T. Reed & Co.	11,830	
Caesar & Co., Ltd.	11,440	
Geo. Stuart & Co.	4,160	
W. Mansfield & Co.	2,990	
Cheras Rubber Estate	2,470	
Sungei Pureen Rubber Co.	1,300	
L. Littlejohn & Co.		
United Serdang Rubber Plantation	3,250	550,940
TO AKRON.		
JUNE 3.—By the steamer *Mexico Maru.* Consignee—		
The B. F. Goodrich Co.		
W. T. Easley		173,680
TO NEW YORK.		
Henderson & Korn.		
International Trading Co.	111,540	
Charles T. Wilson Co., Inc.		
H. S. Godwin	27,300	
Robert Radenhop Co.		
H. S. Godwin	20,670	159,510
TO SEATTLE.		
JUNE 13.—By the steamer *Grena.* Consignee—		
The B. F. Goodrich Co.		
W. T. Easley	367,230	
J. T. Johnstone & Co.		
McAlister & Co., Ltd.	134,420	
Henderson & Korn.		
East Asiatic Co., Ltd.	16,380	
Charles T. Wilson Co., Inc.		
F. W. Barton & Co.	3,900	
L. Littlejohn & Co.		
Paterson, Simons & Co.	124,150	
Semblian Estates	6,760	
Goodyear Tire & Rubber Co.		
Boustead & Co.	19,240	
Semblian Estate	4,420	
W. R. Grace & Co.		
Penang Rubber Estate	11,050	
Sandilands, Buttery & Co.	10,400	697,970
TO SAN FRANCISCO.		
W. R. Grace & Co.		
Sandilands, Buttery & Co.	96,200	
Fox & Co.		
Sandilands, Buttery & Co.	8,320	104,520
TO AKRON.		
JUNE 16.—By the steamer *Teucer.* Consignee—		
Firestone Tire & Rubber Co.		
The Waterhouse Co.	87,360	
J. T. Johnstone & Co.		
Merliman Rubber Estate	23,400	
James Snodgrass	19,240	
Harrisons & Crosfield	9,230	
Pelmadulla Rubber Co.	8,580	
Pegoh, Ltd.	8,190	
Selangor Rubber Co.	7,280	
Guthrie & Co.	5,590	
Adamson, Gelfellow & Co.	3,640	
Paterson, Simons & Co.	2,860	
Siginting Rubber Estate	2,600	
Glenshiel Rubber Estate	2,470	
Buket Lentang Rubber Estate	2,210	
Goodyear Tire & Rubber Co.		
Harrisons & Crosfield	177,840	
Guthrie & Co.	31,850	
W. Mansfield & Co.	11,830	
The Rubber Estates	5,330	
United Suan Rubber Estate	3,120	
Glenshiel Rubber Estate	2,470	
Port Dickson Lukut Rubber Estate	1,990	
Kombak Rubber Co.	1,560	418,640
TO BOSTON.		
Hood Rubber Co.		
Jugra Estates	4,680	
The Glenshiel Rubber Estate	2,470	7,150
TO NEW YORK.		
United States Rubber Co.		
General Rubber Co.	122,590	
W. Mansfield & Co.	13,000	

	Pounds.	
Charles T. Wilson Co., Inc.		
Pilmoor Rubber Co.	7,280	
Whittall & Co.	3,640	
Clovelly Rubber Estate	2,730	
Aldens' Successors, Ltd.		
Glenshiel Rubber Estate	6,370	
United Serdang Rubber Plantation	3,250	
Harrisons & Crosfield	2,340	
Henderson & Korn.		
United Serdang Rubber Plantation	9,620	
J. T. Johnstone & Co.		
Cumberbatch & Co.	3,640	
Anglo Sumatra Rubber Co.	2,860	
Arnold & Zeiss.		
Weller & Co.	63,570	
C. W. Mackie & Co.	36,400	
United Serdang Rubber Plantation	4,420	
Tangjang Rubber Co.	2,730	
L. Littlejohn & Co.		
C. W. Mackie & Co.	54,470	
Cumberbatch & Co.	4,420	
Klanang Produce Co.	3,640	
A. A. Anthony & Co.	2,990	
Arthur Meyer & Co.		
Guthrie & Co.	18,850	
Adamson, Gelfellow & Co.	6,500	
Cumberbatch & Co.	1,820	
Port Dickson Rubber Estate	1,690	376,120
TO SEATTLE.		
The B. F. Goodrich Co.		
W. T. Easley	150,930	
W. R. Grace & Co.		
Guthrie & Co.	20,280	
Carson & Co.	11,830	
Planters Stores & Agency Co.	9,700	
T. R. Reid & Co.	6,110	
Whittall & Co.	4,550	
W. Mansfield & Co.	2,860	
Sandilands, Buttery & Co.	1,950	
Goodyear Tire & Rubber Co.		
C. W. Mackie & Co.	29,250	
Cumberbatch & Co.	8,840	
Planters Stores & Agency Co.	4,420	
Buket Cloh Rubber Co.	3,640	
L. Littlejohn & Co.		
The Mahawale Tea & Rubber Co.	6,890	
Chempul Rubber Estate	4,680	
Sungei Baru Rubber Estate	3,516	
United Serdang Rubber Plantation	3,250	272,696
TO AKRON.		
JUNE 17.—By the steamer *Tokai Maru.* Consignee—		
The B. F. Goodrich Co.		
W. T. Easley		223,990
TO SAN FRANCISCO.		
JUNE 15.—By the steamer *Kamakura Maru.* Consignee—		
Goodyear Tire & Rubber Co.		
Cumberbatch & Co., Ltd.		7,280
GUTTA JELUTONG.		
TO SEATTLE.		
MAY 26.—By the steamer *Talthybius.* Consignee—		
William Brandts Sons & Co.		
Katz Bros.		99,060
TO SAN FRANCISCO.		
JUNE 13.—By the steamer *Grena.* Consignee—		
S. L. Jones & Co.		
Paterson, Simons & Co.		5,200
TO SEATTLE.		
L. Littlejohn & Co.		
Katz Bros.	266,240	
Paterson, Simons & Co.	206,180	
Dexter-Horton National Bank.		
Huttenbach Bros. & Co.	103,350	
Jaeger & Co.	52,390	
Adamson, Gelfellow & Co.	46,280	
Boustead & Co		
Boustead & Co.	102,180	776,620
GUTTA PERCHA.		
TO SEATTLE.		
JUNE 13.—By the steamer *Grena.* Consignee—		
L. Littlejohn & Co.		
Katz Bros.		69,680
GUTTA SIAK.		
TO SEATTLE.		
JUNE 13.—By the steamer *Grena.*		
L. Littlejohn & Co.		
Paterson, Simons & Co.		63,960

CUSTOM HOUSE STATISTICS.

PORT OF BOSTON—APRIL, 1916.

EXPORTS:	Pounds.	Value.
India rubber boots (*pairs*).	34,544	$66,755
India rubber shoes (*pairs*).	34,185	19,803
Belting, hose, etc.	.....	$25,290
Automobile tires	.....	482,350
Manufactures of india rubber	.....	105,334
Total	.....	$699,532

PORT OF BOSTON—MAY, 1916.

IMPORTS:		
India rubber	21,286	$15,506
Rubber scrap	96,107	42,959
Manufactures of india rubber	.....	2,871
Totals	117,393	$61,336
EXPORTS:		
India rubber boots (*pairs*).	16,979	$38,342
India rubber shoes (*pairs*).	55,967	21,307
Rubber scrap	775	239
Automobile tires	.....	58,004
Other rubber tires	.....	52
Belting, hose, etc.	.....	4,382
All other manufactures of india rubber	.....	36,886
Total	.....	$159,212

PORT OF CHICAGO—APRIL, 1916.

IMPORTS:		
Rubber scrap	35,713	$2,765
Gutta jelutong (Pontianak).	.....	1,050
Totals	35,713	$3,815

PORT OF CHICAGO—MAY, 1916.

IMPORTS:		
Gutta jelutong (Pontianak).	.....	$408

PORT OF CLEVELAND—MAY, 1916.

IMPORTS:		
India rubber	462,833	$339,159
Rubber scrap	111	8
Totals	462,944	$339,167
EXPORTS:		
Reclaimed rubber	45,425	$3,974
Manufactures of india rubber	.....	41
Totals	45,425	$4,015

PORT OF HURON—MAY, 1916.

IMPORTS:		
Rubber scrap	15,950	$136
EXPORTS:		
Rubber scrap	7,762	$587
Reclaimed rubber	47,509	8,354
India rubber boots (*pairs*).	.....	2,295
Automobile tires	.....	2,445
Other rubber tires	.....	2,303
Belting, hose, etc.	.....	96
All other manufactures of india rubber	.....	4,771
Totals	55,271	$20,851

PORT OF NEW YORK—APRIL, 1916.

IMPORTS:		
India rubber	19,885,325	$12,902,100
Balata	256,774	108,139
Gutta percha	136,770	16,559
Gutta jelutong (Pontianak).	1,378,475	65,058
Rubber scrap	607,538	65,208
Totals	22,264,882	$13,157,064
EXPORTS:		
India rubber	26,790	$13,089
Rubber scrap	159,477	21,179
Totals	186,267	$34,268

PORT OF NEW ORLEANS—MAY, 1916.

IMPORTS:		
India rubber	43,096	20,779

PORT OF SAN FRANCISCO—MAY, 1916.

IMPORTS:		
India rubber	949,433	$618,751
Gutta jelutong (Pontianak).	54,243	2,702
Totals	1,003,676	$621,453

PORT OF SEATTLE—APRIL, 1916.

IMPORTS:		
India rubber	2,411,745	$1,620,897
Gutta percha	67,774	8,169
Gutta jelutong (Pontianak).	2,385,005	131,341
Totals	4,864,524	$1,760,407
EXPORTS:		
India rubber shoes (*pairs*).	962	$529
Automobile tires	.....	12,594
Other rubber tires	.....	1,024
All other manufactures of india rubber	.....	12,582
Total	.....	$26,729

PORT OF SEATTLE—MAY, 1916.

IMPORTS:		
India rubber	5,257,146	$4,027,114
Gutta percha	77,280	10,046
Gutta jelutong (Pontianak).	614,020	35,088
Totals	5,948,446	$4,072,248

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named. Reported by Barlow & Co., Singapore. These figures include the production of the Federated Malay States, but not of Ceylon.)

To—	From Singapore. March 31, 1916.	From Malacca. March 31, 1916.	From Penang. March 31, 1916.	From Port Swettenham. April 26, 1916.	Totals.
United Kingdom..*lbs.*	7,499,038	1,200,267	5,850,700	7,077,360	21,627,365
The Continent	4,367,103	.....	20,667	.....	4,387,770
Japan	1,018,616	.....	.....	.....	1,018,616
Ceylon	61,295	.....	182,933	533,744	777,972
United States 20,866,186		.....	2,160,534	.....	23,026,720
Australia	125,363	.....	.....	.....	125,363
Totals 33,937,601		1,200,267	8,214,834	7,611,104	50,963,806
For same period, 1915	15,518,077	2,100,105	7,311,197	9,836,103	34,765,482
For same period, 1914	8,757,515	1,267,175	5,398,000	8,733,149	24,155,839
For same period, 1913	5,376,298	.....	3,503,067	8,552,277	17,431,642

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to May 15, 1915 and 1916. Compiled by the Ceylon Chamber of Commerce.)

To—	1915.	1916.
United States .....*pounds*	4,234,850	10,638,770
Canada and Newfoundland.....	340,140	2,240
France	150,080	586,650
Russia	287,650	120,960
United Kingdom 10,077,699		7,254,410
Australia	144,358	318,900
India	500	600
Straits Settlements	116,056	.....
Japan	164,479	72,276
Totals 15,515,812		18,994,806

(Same period 1914, 12,406,917 pounds; same period 1913, 8,083,692.) The export figures of rubber, given in the above table for 1914, include the imports re-exported. (These amount to 1,286,109 pounds from the Straits Settlements and 265,344 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1915 and 1916 are for Ceylon rubber only.

FEDERATED MALAY STATES RUBBER EXPORTS.

An official cablegram from Kuala Lumpur states that 3,956 tons of plantation rubber were exported from the Federated Malay States in the month of May as against 3,904 tons in April and 2,708 tons in the corresponding month last year. The total export for five months of the current year amounted to 21,967 tons, compared with 15,787 tons in 1915 and 11,544 tons in 1914.

Appended are the comparative statistics:

	1914.	1915.	1916.
January .....*tons*	2,542	3,473	4,471
February	2,364	3,411	5,207
March	2,418	3,418	4,429
April	2,151	2,777	3,904
May	2,069	2,708	3,956
Totals	11,544	15,787	21,967

STRAITS SETTLEMENTS RUBBER EXPORTS.

A cablegram from the Colonial Secretary, Singapore, notifies that the export of plantation rubber from Straits Settlements ports in the month of April amounted to 4,219 tons compared with 4,481 tons in March and 1,978 tons in the corresponding month last year. The total export for the first four months of the current year amounted to 16,502 tons against 9,772 tons in 1915 and 5,717 tons in 1914. Appended are the comparative statistics:

	1914.	1915.	1916.
January .....*tons*	1,181	2,576	4,443
February	1,703	2,741	3,359
March	1,285	2,477	4,481
April	1,548	1,978	4,219
Totals	5,717	9,772	16,502

These figures include transhipments of rubber from various places in the neighborhood of the Straits Settlements such as Java, Sumatra, Borneo and the non-Federated Malay States as well as rubber actually exported from the Colony, but do not include rubber exports from the Federated Malay States.

RUBBER AND GUTTA EXPORTS FROM JAVA AND MADURA.

		February, 1915.	February, 1916.	Two Months Ending February, 1915.	Two Months Ending February, 1916.
PLANTATION, TO—					
Holland .....Ficus ....*pounds*		.....	.....	3,890	.....
	Hevea	94,600	28,600	195,800	28,600
	Hevea (to order)	2,200	.....	4,400	.....
	Manihot (Ceara)	2,559	.....	2,559	.....
	Totals	99,359	28,600	206,649	28,600
Great Britain ...Ficus		.....	2,512	1,505	3,876
	Hevea	195,800	591,800	622,600	1,049,400
	Manihot (Ceara)	.....	11,979	.....	11,979
	Castilloa	.....	5,381	10,408	11,066
	Totals	195,800	611,672	634,513	1,076,321
Singapore .....Ficus		.....	3,366	37	5,419
	Hevea	55,000	217,800	79,200	422,400
	Manihot (Ceara)	.....	.....	.....	1,168
	Castilloa	.....	.....	.....	2,255
	Totals	55,000	221,166	79,237	431,242
United States ....Ficus		.....	473	.....	3,912
	Hevea	389,400	1,135,200	578,600	2,004,200
	Manihot (Ceara)	8,692	6,560	8,692	11,114
	Totals	398,092	1,142,233	587,292	2,019,226
Australia .....Ficus		.....	1,672	.....	1,672
	Hevea	.....	4,400	.....	4,400
	Totals	.....	6,072	.....	6,072
Japan .....Hevea		57,200	6,600	77,000	39,600
Russia .....Hevea		.....	13,200	.....	13,200
Grand Totals..		805,451	2,029,543	1,584,691	3,614,261
GUTTA PERCHA, TO—					
Singapore		92,620	19,778	183,502	19,778
GUTTA JELUTONG, TO—					
Singapore		.....	.....	1,584	1,606

EXPORTS OF INDIA RUBBER FROM MANAOS DURING APRIL, 1916.

EXPORTERS.	NEW YORK. Fine.	Medium.	Coarse.	Caucho.	Totals.	EUROPE. Fine.	Medium.	Coarse.	Caucho.	Totals.	Grand Totals.
General Rubber Co. of Brazil.*kilos*	134,929	24,336	86,085	92,632	337,982	33,600	23,495	371	130	57,596	395,578
Tancredo Porto & Co.....	59,280	5,786	24,683	33,408	123,157	72,085	23,263	15,787	27,857	138,992	262,149
Adelbert H. Alden, Ltd.....	64	5,858	7,373	609	13,904	25,949	.....	1	158,511	184,461	198,365
I. G. Araujo	13,832	2,694	3,188	15,527	35,241	8,574	1,225	3,007	300	13,106	48,347
Alfredo Martins Pereiro.....	10,625	1,170	7,787	10,634	30,216	.....	.....	.....	.....	.....	30,216
Co. M. Grossense Bola, Ltd.....	24,773	.....	3,793	916	29,482	.....	.....	.....	.....	.....	29,482
M. Lobo	2,568	4,517	9,271	5,822	22,178	.....	.....	.....	.....	.....	22,178
G. Fradelizi	.....	.....	.....	.....	.....	21,071	.....	.....	.....	21,071	21,071
I. Carneiro da Motta.....	10,341	2,012	2,434	1,682	16,469	.....	.....	.....	.....	.....	16,469
B. Lévy & Co.....	174	46	993	11,970	13,183	2,400	160	720	.....	3,280	16,463
Suter & Co.....	6,800	.....	3,810	.....	10,610	.....	.....	.....	5,761	5,761	16,371
Armazens Andresen	.....	.....	.....	.....	.....	10,404	461	2,783	91	13,739	13,739
Sundries	9,444	706	1,861	2,530	14,541	548	291	832	415	2,086	16,627
Totals	272,830	47,125	151,278	175,730	646,963	174,631	48,895	23,501	193,065	440,092	1,087,055
In transit, Iquitos	61,507	1,431	17,115	201,284	281,337	38,051	1,660	11,918	58,971	110,600	391,937
Totals: April, 1916	334,337	48,556	168,393	377,014	928,300	212,682	50,555	35,419	252,036	550,692	1,478,992
March, 1916	502,323	76,236	228,580	320,482	1,127,621	450,320	87,029	49,033	318,648	905,030	2,032,651
February, 1916	546,003	82,739	191,537	205,419	1,025,698	164,400	27,819	56,344	119,229	367,792	1,393,490
January, 1916	561,143	110,411	176,779	148,142	996,475	543,822	58,574	75,105	123,703	801,204	1,797,679

(Compiled by Suter & Co., Manaos.)

IMPORTS AND EXPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

IMPORTS.

Week Ending—	India Rubber. Pounds.	Value.	Scrap for Re-manufacture. Pounds.	Value.	Balata. Pounds.	Value.	Gutta Jelutong. Pounds.	Value.	Gutta Percha. Pounds.	Value.
May 19, 1916.....	.....	$4,724	.....	.....	.....	.....	.....	.....	.....	$35
	7,078,350	4,158,326	292,307	$20,863	24,328	$9,961	.....	.....	.....	.....
May 26, 1916.....	.....	13,625	.....	.....	.....	.....	.....	.....	.....	8,579
	2,982,121	2,098,716	396,489	24,786	.....	.....	.....	.....	12,813	2,693
June 2, 1916.....	.....	1,253	.....	.....	.....	.....	.....	.....	.....	.....
	5,492,836	3,599,252	61,865	3,387	51,743	22,478	426,354	$30,992	193,119	21,112
June 9, 1916.....	.....	13,062	.....	.....	.....	.....	.....	.....	.....	8,579
	3,772,074	2,340,269	134,349	9,770	19,905	6,884	473,375	28,443	.....	.....
June 16, 1916.....	.....	11,793	.....	.....	.....	.....	.....	.....	.....	4,310
	5,140,043	3,242,158	94,924	8,502	18,417	6,165	424,251	18,184	.....	.....

*Pounds not specified.

In addition to the above, 5,300 pounds of Gum Chicle was imported from British Honduras valued at $1,823 for the week ending May 19, 1916, also 33,492 pounds valued at $20,710 from Canada and 1,162 pounds valued at $299 for the week of May 26, 1916.

EXPORTS.

FIGURES ISSUED FROM MAY 24, 1916, TO JUNE 24, 1916.

EXPORTED TO—	Belting, Hose and Packing.	Footwear. Boots.	Footwear. Shoes.	Tires. Auto.	Tires. Other.	Insulated Wire and Cables.	Other manf. of India Rubber.	Fountain Pens.	Chewing Gum.	Reclaimed Rubber.	Scrap Rubber.
NORTH AMERICA:											
Bermuda	.....	.....	$6	$71	.....	$2	$158	.....	$49	.....	.....
British Honduras	$65	.....	.....	.....	$38	.....	23	$14	.....	.....	.....
Canada	.....	.....	150	.....	.....	.....	379	87	.....	.....	.....
Central American States—											
Costa Rica	1,210	.....	.....	792	1,062	236	1,953	.....	379	.....	.....
Guatemala	83	.....	52	1,239	491	.....	886	.....	241	.....	.....
Honduras	552	.....	.....	1,831	418	108	1,109	.....	61	.....	.....
Nicaragua	331	.....	.....	.....	.....	.....	913	.....	45	.....	.....
Panama	10,550	.....	924	10,569	2,899	32,708	4,273	263	2,179	.....	.....
Salvador	388	.....	.....	336	71	159	3,560	.....	.....	.....	.....
Mexico	6,482	$280	26	16,504	813	4,932	4,114	.....	99	.....	$55
Newfoundland	202	2,391	1,410	479	478	1,221	923	19	496	.....	.....
West Indies—											
British—											
Barbados	35	.....	.....	213	.....	.....	2,634	.....	.....	.....	.....
Jamaica	916	.....	11	6,140	212	89	1,911	28	.....	.....	.....
Trinidad and Tobago	848	.....	.....	3,155	117	78	620	2	.....	.....	.....
Other British	152	.....	.....	386	300	3	538	249	35	.....	.....
Cuba	17,139	.....	922	99,355	10,731	23,900	38,640	425	1,955	.....	.....
Danish	26	.....	31	29	34	.....	9	231	.....	.....	.....
Dutch	666	.....	14	514	8	111	192	373	25	.....	.....
French	.....	.....	14	487	.....	.....	32	15	.....	.....	.....
Haiti	67	.....	1	99	8	56	621	271	44	.....	.....
Santo Domingo	286	.....	69	1,692	330	.....	596	36	.....	.....	.....
Totals, North America	$39,998	$2,671	$3,630	$143,891	$18,010	$63,603	$64,084	$2,013	$5,608	.....	$55
EUROPE:											
Azores Islands	.....	.....	.....	.....	.....	.....	$34	.....	.....	.....	.....
Denmark	$1,071	.....	.....	$634	$840	$2,100	293	.....	.....	.....	.....
Finland	976	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
France	787	$6,745	$6,249	21,445	81,455	3,033	138,625	.....	$7,800	.....	.....
Gibraltar	587	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greece	6,278	.....	.....	250	575	.....	736	.....	1,378	.....	.....
Italy	.....	4	.....	190	6,171	767	17,134	$1,299	.....	.....	.....
Netherlands	549	.....	.....	291	59	2,627	1,988	.....	.....	.....	.....
Norway	2,547	.....	12,048	6,247	.....	68,767	1,766	.....	.....	.....	.....
Portugal	.....	.....	.....	253	100	.....	327	109	.....	.....	.....
Russia in Europe	4,303	.....	.....	1,177	.....	321	2,146	134	.....	.....	.....
Spain	.....	.....	.....	3,360	.....	22,211	1,100	149	.....	.....	.....
Sweden	.....	.....	.....	11,264	.....	.....	8,690	.....	.....	.....	.....
United Kingdom—											
England	86,099	139	31,812	1,279,391	260,455	62,358	411,307	2,159	23,782	11,654	20,721
Scotland	9,770	.....	$	.....	10	.....	12,449	69	.....	.....	2,504
Ireland	.....	.....	.....	29	.....	.....	.....	.....	.....	.....	.....
Totals, Europe	$112,967	$6,888	$50,114	$1,324,531	$349,665	$162,184	$596,595	$3,919	$32,960	$11,654	$23,225
SOUTH AMERICA:											
Argentina	$5,401	.....	$353	$23,714	$47,406	$9,672	$38,730	$1,505	$710	$1,700	.....
Bolivia	647	.....	.....	403	.....	194	888	.....	.....	.....	.....
Brazil	22,213	$207	3,316	57,092	6,518	45,509	40,871	668	605	.....	.....
Chile	26,808	529	950	23,245	4,026	6,083	43,871	.....	21	.....	.....
Columbia	1,860	.....	38	3,410	1,514	676	5,280	2	126	21,250	.....
Ecuador	687	.....	.....	854	.....	1,096	1,448	.....	20	.....	.....
Guiana—British	326	.....	.....	176	.....	60	352	321	.....	.....	.....
Dutch	.....	.....	.....	90	.....	.....	3	.....	.....	.....	.....
Peru	6,674	.....	.....	1,385	725	1,500	7,344	.....	557	.....	.....
Uruguay	1,345	.....	5	3,396	3,066	5,603	3,926	.....	190	.....	.....
Venezuela	1,740	.....	29	5,323	1,518	1,712	5,489	6	58	.....	.....
Totals, South America	$67,701	$736	$4,691	$119,088	$64,773	$72,105	$148,202	$2,502	$2,287	$22,950	.....
ASIA:											
Aden	.....	.....	.....	$331	.....	.....	.....	.....	.....	.....	.....
China	$161	.....	.....	999	.....	$361	$402	.....	.....	.....	.....
British East Indies—											
British India	1,644	.....	.....	9,315	$117	3,838	5,211	$1,340	.....	.....	.....
Straits Settlements	140	.....	.....	26,410	195	.....	89	106	.....	.....	.....
Dutch East Indies	125	.....	$27	4,020	.....	6,503	.....	65	.....	.....	.....
Hongkong	.....	.....	.....	.....	.....	.....	.....	.....	$336	.....	.....
Japan	.....	.....	1,943	.....	.....	.....	1,284	.....	.....	$4,032	.....
Russia in Asia	.....	.....	.....	.....	.....	198	.....	.....	.....	.....	.....
Siam	.....	.....	.....	817	239	.....	6	.....	.....	.....	.....
Totals, Asia	$2,070	.....	$1,970	$41,892	$551	$10,900	$7,002	$1,511	$336	$4,032	.....
OCEANIA:											
British—											
Australia and Tasmania	$1,310	$25	$3,435	$3,113	$498	$5,495	$9,494	$531	$3,538	.....	.....
New Zealand	72	.....	.....	32,067	1,725	328	8,167	.....	.....	.....	.....
British Oceania	.....	.....	258	.....	.....	.....	.....	.....	.....	.....	.....
Philippine Islands	34	.....	2,373	8,399	486	18,821	7,307	65	820	.....	.....
Totals, Oceania	$1,416	$25	$6,066	$43,579	$2,709	$24,644	$24,968	$596	$4,358	.....	.....
AFRICA:											
British Africa—											
West	.....	.....	.....	$69	.....	.....	.....	.....	.....	.....	.....
South	$50,045	.....	$1,244	25,038	$870	$1,851	$12,755	.....	$894	.....	.....
East	.....	.....	.....	2,171	.....	.....	.....	.....	.....	.....	.....
Canary Islands	.....	.....	.....	.....	.....	.....	81	.....	.....	.....	.....
Egypt	.....	.....	.....	.....	.....	.....	.....	.....	450	.....	.....
Madagascar	.....	.....	.....	197	.....	.....	.....	.....	.....	.....	.....
Portuguese Africa	.....	.....	.....	.....	.....	.....	195	.....	.....	.....	.....
Totals, Africa	$50,045	.....	$1,244	$27,475	$870	$1,851	$13,031	.....	$1,344	.....	.....

In addition to the above, Balata was exported to England valued at $20,000.

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—(*free*):	March, 1916. Pounds.	March, 1916. Value.	Nine Months Ending March, 1916. Pounds.	Nine Months Ending March, 1916. Value.
India rubber:				
From France	76,182	$53,178	379,497	$214,052
Portugal	450,221	200,117	2,440,328	953,054
United Kingdom	5,885,915	4,528,302	53,709,713	34,079,703
Central America and British Honduras	77,060	36,026	870,097	391,629
Mexico	904,492	314,714	2,900,082	1,095,478
Brazil	3,853,741	2,041,913	38,158,671	16,956,739
Other South America	240,437	122,337	4,698,296	2,119,742
East Indies	15,921,259	10,598,855	83,199,316	46,524,551
Other countries	3,330	1,639	617,556	429,120
Totals	27,412,637	$17,897,081	186,973,556	$102,764,068
Balata	265,240	107,034	2,047,071	789,278
Guayule gum	197,730	51,370	2,001,708	648,835
Gutta jelutong	1,246,566	79,862	17,700,561	798,019
Gutta percha	232,725	28,534	1,839,639	202,729
Totals	29,354,898	$18,163,881	210,562,535	$105,202,929
Rubber scrap	1,801,394	146,344	12,740,263	984,650
Totals, unmanufactured	31,156,292	$18,310,225	223,302,798	$106,187,579
Chicle (*dutiable*)	714,965	$308,574	5,441,674	$2,026,256
MANUFACTURED—(*dutiable*):				
Gutta percha	.....	$219	.....	$7,150
India rubber	.....	64,266	.....	266,417
Totals, manufactured	.....	$64,485	.....	$273,567
Substitutes—elasticon, etc.	.....	$1,024	.....	$14,409

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—	March, 1916. Pounds.	March, 1916. Value.	Nine Months Ending March, 1916. Pounds.	Nine Months Ending March, 1916. Value.
Automobile tires:				
To Russia in Europe	.....	$30,200	.....	$1,116,270
England	.....	634,750	.....	6,492,482
Canada	.....	58,091	.....	940,401
Mexico	.....	23,643	.....	193,962
Cuba	.....	42,248	.....	351,599
Australia	.....	147,328	.....	1,093,952
New Zealand	.....	160,226	.....	725,684
Philippine Islands	.....	19,759	.....	241,055
Other countries	.....	310,378	.....	2,015,473
Totals	.....	$1,426,623	.....	$13,170,878
All other tires	.....	153,172	.....	2,168,642
Belting, hose and packing	.....	293,289	.....	2,066,922
Rubber boots (*pairs*)	18,532	47,748	621,643	1,403,288
Rubber shoes (*pairs*)	154,683	83,806	1,432,614	762,023
Scrap and old rubber	425,711	46,204	3,061,629	336,517
Reclaimed rubber	669,668	95,142	4,987,274	670,949
Other rubber manufactures	.....	740,749	.....	4,798,507
Totals, manufactured	.....	$2,886,733	.....	$25,377,726
Fountain pens (*number*)	15,809	$11,326	125,513	$109,623

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—	March, 1916. Pounds.	March, 1916. Value.	Nine Months Ending March, 1916. Pounds.	Nine Months Ending March, 1916. Value.
Balata	55,784	$27,086	399,771	$156,671
Guayule gum	.....	.....	18,500	7,770
Gutta jelutong	.....	.....	2,773	305
Gutta percha	133	70	60,023	11,446
India rubber	380,121	249,284	3,618,857	2,043,563
Rubber scrap and refuse	.....	.....	9,204	734
Totals, unmanufactured	436,038	$276,440	4,109,128	$2,220,489
Chicle	2,655	$957	111,661	$32,743
MANUFACTURED—				
Gutta percha	.....	$297	.....	$537
India rubber	.....	.....	.....	37,113
Totals, manufactured	.....	$297	.....	$37,650

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

	March, 1916. Pounds.	March, 1916. Value.	Nine Months Ending March, 1916. Pounds.	Nine Months Ending March, 1916. Value.
To Alaska:				
Belting, hose and packing	.....	$11,042	.....	$86,123
Boots and shoes (*pairs*)	5,092	12,149	47,088	118,728
Other rubber goods	.....	2,082	.....	23,459
Totals	.....	$25,273	.....	$228,310
To Hawaii:				
Belting, hose and packing	.....	$4,926	.....	$63,539
Automobile tires	.....	53,615	.....	403,779
Other tires	.....	5,497	.....	55,167
Other rubber goods	.....	6,507	.....	65,832
Totals	.....	$70,545	.....	$588,317
To Philippine Islands:				
Belting, hose and packing	.....	$9,124	.....	$44,925
Boots and shoes (*pairs*)	11	6	16,717	14,696
Tires	.....	31,015	.....	291,124
Other rubber goods	.....	7,209	.....	129,015
Totals	.....	$47,354	.....	$479,760
To Porto Rico:				
Belting, hose and packing	.....	$2,739	.....	$30,365
Automobile tires	.....	23,737	.....	274,178
Other tires	.....	3,423	.....	28,360
Other rubber goods	.....	7,701	.....	51,067
Totals	.....	$37,600	.....	$383,970

FOR QUARTER ENDING DECEMBER 31, 1915.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Oct. 1, to Dec. 31, 1915. Pounds.	Oct. 1, to Dec. 31, 1915. Value.
Unmanufactured—(*free*):		
Balata, crude	714,208	$265,574
Guayule, gum	111,270	98,157
Gutta jelutong	5,470,936	230,917
Gutta percha, crude	499,120	55,421
India rubber, crude	61,065,638	31,127,185
Scrap rubber	3,000,093	189,491
Reclaimed rubber	535,786	74,520
Totals	71,397,051	$32,041,265
Manufactured—(*dutiable*):		
Gutta percha, 10 per cent	.....	$1,391
India rubber, 10 per cent	.....	86,769
Druggists' sundries of rubber, 15 per cent	.....	4,003
Hard rubber, 25 per cent	.....	3,777
Rubber sponges, 15 per cent	.....	1,764
Substitutes, elasticon, etc., 15 per cent	.....	6,220
Totals	.....	$103,924
Chicle: Crude	245,424	$105,695
Refined	445,428	241,110
Totals	690,852	$346,805

RUBBER STATISTICS FOR CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—(*free*):	March, 1916. Pounds.	March, 1916. Value.	Twelve Months Ending March, 1916. Pounds.	Twelve Months Ending March, 1916. Value.
Rubber and gutta percha, crude caoutchouc or india rubber:				
From Great Britain	667,187	$475,043	5,113,081	$3,053,038
United States	447,763	321,042	4,545,489	2,542,260
Straits Settlements	.....	.....	22,574	11,659
Other countries	.....	.....	232,045	106,318
Totals	1,114,950	$769,085	9,913,189	$5,713,275
Rubber, re-covered:				
From Great Britain	.....	.....	4,392	$2,482
United States	510,426	$67,761	4,835,209	625,803
Totals	510,426	$67,761	4,839,601	$628,285
Hard rubber, in sheets and rods:				
From Great Britain	.....	.....	2,302	$1,404
United States	6,202	$2,062	164,835	21,702
Totals	6,202	$2,062	167,137	$23,106
Rubber substitute:				
From Great Britain	12,412	$1,296	29,056	$3,108
United States	103,334	8,248	576,605	45,066
Totals	115,747	$9,544	605,661	$48,174
Rubber, powdered, and rubber or gutta percha waste:				
From Great Britain	.....	.....	7,314	$579
United States	224,875	$14,781	1,313,608	85,627
Other countries	.....	.....	15,594	634
Totals	224,875	$14,781	1,336,516	$86,840
Rubber thread, not covered:				
From United States	580	$890	32,334	$44,314
Balata, crude:				
From United States	.....	.....	1,644	$991
Chicle, crude:				
From Great Britain	.....	.....	2,888	$1,675
United States	858	$291	260,519	98,981
British Honduras	141,001	52,126	1,274,906	472,211
Mexico	61,291	22,854	367,220	135,877
Totals	203,150	$75,271	1,905,533	$708,744

MANUFACTURED—(*dutiable*):	March, 1916. General Tariff. Value.	March, 1916. Preferential Tariff. Value.	Twelve Months Ending March, 1916. General Tariff. Value.	Twelve Months Ending March, 1916. Preferential Tariff. Value.
Waterproof clothing:				
From Great Britain	.....	$20,515	$3,454	$322,421
United States	$16,813	.....	125,953	.....
Other countries	.....	.....	63	.....
Totals	$16,813	$20,515	$129,470	$322,421

Hose, lined with rubber:				
From Great Britain	.....	$101	.....	$646
United States	$7,620	.....	$79,108	.....
Totals	$7,620	$101	$79,108	$646
Mats and matting:				
From Great Britain	.....	$5	.....	$126
United States	$89	.....	$2,612	.....
Totals	$89	$5	$2,612	$126
Packing:				
From Great Britain	.....	$227	$201	$1,436
United States	$8,533	.....	57,361	.....
Totals	$8,533	$227	$57,562	$1,436
Tires of rubber for all vehicles:				
From Great Britain	$703	$2,673	$14,805	$26,700
United States	70,604	.....	1,358,080	.....
France	143	.....	16,580	.....
Other countries	297	.....	2,114	.....
Totals	$71,747	$2,673	$1,391,579	$26,700
***Rubber cement and all other manufactures of india rubber and gutta percha, N. O. P.:**				
From Great Britain	$288	$30,601	$2,709	$189,940
United States	81,721	.....	625,362	.....
Other countries	233	.....	1,297	.....
Totals	$82,242	$30,601	$629,368	$189,940
Hard rubber, in tubes:				
From United States	$1,209	.....	$5,585	.....
Boots and shoes:				
From Great Britain	.....	.....	.....	$11,558
United States	$13,296	.....	$94,162	.....
Other countries	.....	.....	10	.....
Totals	$13,296	.....	$94,172	$11,558
Belting:				
From Great Britain	.....	.....	.....	$1,172
United States	$5,627	.....	$53,299	.....
Totals	$5,627	.....	$53,299	$1,172
Webbing—over one inch wide:				
From Great Britain	$26	$1,611	$104	$13,858
United States	27,750	.....	186,069	.....
Other countries	.....	.....	330	.....
Totals	$27,776	$1,611	$186,503	$13,858

*In addition the imports of rubber cement and all manufactures of india rubber and gutta percha not otherwise provided for amounted to $13 from Great Britain and $40 from various countries for March; and $220 from Great Britain and $2,146 from various countries for the twelve months ending March, 1916, the values being at treaty rates.

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

MANUFACTURED—(*dutiable*):	March, 1916. Produce of Canada. Value.	March, 1916. Re-exports of foreign goods. Value.	Twelve Months Ending March, 1916. Produce of Canada. Value.	Twelve Months Ending March, 1916. Re-exports of foreign goods. Value.
Belting:				
To Great Britain	.....	.....	$150	.....
United States	.....	.....	424	$58
Newfoundland	$291	.....	1,291	.....
Other countries	.....	.....	33	.....
Totals	$291	.....	$1,898	$58
Hose:				
To Great Britain	$42,431	.....	$66,030	.....
United States	.....	.....	3,976	$201
Newfoundland	379	.....	3,612	.....
Other countries	.....	.....	16,518	.....
Totals	$42,810	.....	$90,136	$201
Boots and shoes:				
To Great Britain	$280,737	.....	$1,018,385	.....
United States	77	.....	3,710	$528
Newfoundland	2,293	.....	85,005	.....
Australia	2,298	.....	33,094	.....
Other countries	867	.....	35,302	327
Totals	$286,272	.....	$1,175,496	$855
Mats and matting:				
To Great Britain	$140	.....	$2,687	.....
Newfoundland	18	.....	18	.....
Other countries	.....	.....	469	.....
Totals	$158	.....	$3,174	.....
Clothing:				
To Great Britain	.....	.....	$27	$10
United States	$5	.....	44	208
Newfoundland	.....	.....	140	.....
Other countries	56	.....	238	.....
Totals	$61	.....	$449	$218

***Rubber waste:**				
To Great Britain	.....	.....	$6,368	.....
United States	$48,767	.....	$80,897	$1,964
Totals	$48,767	.....	$587,265	$1,964
All other mnf., N. O. P.:				
To Great Britain	$110,654	$3	$956,495	$3,955
United States	16,654	1,668	119,936	285,614
Newfoundland	463	.....	5,438	785
Australia	251	.....	4,827	.....
Other countries	20,690	.....	136,760	10
Totals	$148,712	$1,671	$1,223,456	$290,364
†Gum chicle:				
To Great Britain	$10,000	$5,000	$20,000	$5,000
United States	146,417	.....	954,887	112,840
Other countries	.....	.....	42,216	1,107
Totals	$156,417	$5,000	$1,017,103	$118,947

*During March 576,000 pounds of rubber waste was exported to the United States, making a total of 8,718,500 pounds for the twelve months ending March, 1916. For the twelve months ending March, 1916, 60,600 pounds was exported to Great Britain.

†During March, 20,000 pounds of gum chicle was exported to Great Britain and 262,555 pounds to the United States. During the twelve months ending March, 1916, 40,000 pounds was exported to Great Britain, 1,719,429 pounds to the United States, and 64,620 pounds to various countries.

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

UNMANUFACTURED—	May, 1916. Pounds.	May, 1916. Value.	Five Months Ending May, 1916. Pounds.	Five Months Ending May, 1916. Value.
Crude rubber:				
From Dutch East Indies	1,115,800	$750,262	3,331,200	$2,387,928
French West Africa	88,800	52,211	951,000	498,033
Gold Coast	93,500	36,377	744,700	314,398
Other countries in Africa	731,300	381,811	3,835,800	2,050,773
Peru	201,200	122,754	804,600	549,287
Brazil	2,212,700	1,447,114	12,386,700	8,569,271
British India	280,100	191,780	1,988,100	1,508,412
Straits Settlements and dependencies, including Labuan	3,411,200	2,450,407	24,203,300	18,316,659
Federated Malay States	3,185,700	2,537,566	12,645,000	9,582,345
Ceylon and dependencies	1,262,100	880,569	9,250,800	7,117,241
Other countries	326,100	413,800	1,346,900	1,915,675
Totals	13,108,500	$9,264,651	71,488,100	$52,810,022
Waste and reclaimed rubber	373,800	$30,861	2,829,500	$317,922
Gutta percha	782,600	322,923	3,408,100	1,577,362
MANUFACTURED—				
Apparel, waterproofed	.....	$10,745	.....	$32,984
Boots and shoes (*dozen pairs*)	14,307	157,731	83,603	756,740
Insulated wire	.....	74,023	.....	241,484
Submarine cables	.....	.....	.....	30,292
Automobile tires and tubes	.....	1,501,492	.....	6,747,487
Motorcycle tires and tubes	.....	40,114	.....	192,849
Cycle tires and tubes	.....	82,775	.....	264,418
Tires not specified	.....	2,250	.....	22,827

EXPORTS.

MANUFACTURED—	May, 1916. Pounds.	May, 1916. Value.	Five Months Ending May, 1916. Pounds.	Five Months Ending May, 1916. Value.
Apparel, waterproofed:				
To France	.....	$23,158	.....	$146,314
British South Africa	.....	9,807	.....	77,229
British East Indies	.....	24,825	.....	63,520
Australia	.....	42,357	.....	138,968
New Zealand	.....	13,545	.....	89,387
Canada	.....	15,168	.....	82,338
Other countries	.....	121,262	.....	400,318
Totals	.....	$260,122	.....	$998,074
Boots and shoes (*dozen pairs*)	11,217	$60,497	40,826	$210,550
Insulated wire	.....	211,633	.....	902,365
Submarine cables	.....	74,722	.....	491,775
Automobile tires and tubes	.....	500,524	.....	1,880,263
Motorcycle tires and tubes	.....	47,920	.....	171,225
Cycle tires and tubes	.....	402,753	.....	1,312,938
Tires not specified	.....	101,716	.....	371,825
Manufactures not specified	.....	667,084	.....	2,849,667

EXPORTS—FOREIGN AND COLONIAL.

UNMANUFACTURED—	May, 1916. Pounds.	May, 1916. Value.	Five Months Ending May, 1916. Pounds.	Five Months Ending May, 1916. Value.
Crude rubber:				
To Russia	1,311,700	$1,035,073	5,891,300	$4,359,548
France	1,096,600	856,818	7,676,100	6,042,912
United States	8,299,400	6,666,739	27,346,400	21,109,581
Other countries	1,803,500	1,375,793	8,290,500	5,951,697
Totals	12,511,200	$9,934,423	49,204,300	$37,463,738
Waste and reclaimed rubber	57,800	$9,696	253,000	$42,520
Gutta percha	75,800	44,456	266,200	141,627

MANUFACTURED—				
Apparel, waterproofed	.....	$78	.....	$681
Boots and shoes. (*dozen pairs*)	663	3,441	11,516	66,404
Insulated wire	.....	17,627	.....	45,378
Automobile tires and tubes	.....	507,773	.....	1,710,180
Motorcycle tires and tubes	.....	12,281	.....	24,405
Cycle tires and tubes	.....	37,558	.....	103,105
Tires not specified	.....	972	.....	4,500

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Two Months Ending February, 1915.		Two Months Ending February, 1916.	
UNMANUFACTURED—	Pounds.	Value.	Pounds.	Value.
India rubber and gutta percha —raw and reclaimed:				
From Straits Settlements	246,620	.....	9,900	.....
African Fr. Colony	.....	.....	6,380	.....
Belgian Congo	.....	.....	66,660	.....
Brazil	322,520	.....	1,729,860	.....
Other countries	42,020	.....	234,520	.....
Totals	611,160	$375,308	2,047,320	$1,257,241
Rubber scrap	7,920	$486	526,460	$32,329
MANUFACTURED—				
India rubber and gutta percha —threads:				
From United States	5,720	.....	8,580	.....
Great Britain	6,160	.....	8,580	.....
Other countries	.....	.....	220	.....
Totals	11,880	$18,750	17,380	$27,445
India rubber and gutta percha —sheets:				
Cut sheets	1,100	$1,457	220	$291
Elastic fabric	440	135	220	67
Hard rubber	1,100	675	10,560	6,485
India rubber and gutta percha —tubes:				
Cut sheets	440	$656	.....	.....
Elastic fabric:				
From Austria-Hungary	220	.....	.....	.....
Germany	2,640	.....	.....	.....
Other countries	6,820	.....	1,540	.....
Totals	9,680	$4,161	1,540	$662
Other forms	440	$212	1,100	$531
Belting	10,780	$5,674	28,160	$14,822
Rubber coated fabrics. (*pieces*)	6,380	$6,716	28,380	$29,876
Other forms:				
From Great Britain	1,760	.....	4,840	.....
Other countries	220	.....	.....	.....
Totals	1,980	$1,303	4,840	$3,184
Rubber boots and shoes (*pairs*):				
From United States	5,948	.....	6,224	.....
Austria-Hungary	1,531	.....	.....	.....
France	30	.....	7,500	.....
Germany	2,590	.....	.....	.....
Other countries	.....	.....	220	.....
Totals	10,089	$7,789	13,725	$10,596
Elastic webbing:				
From Austria-Hungary	3,080	.....	.....	.....
France	2,640	.....	440	.....
Germany	13,640	.....	880	.....
Other countries	4,400	.....	1,100	.....
Totals	23,760	$33,350	2,420	$3,397
Elastic fabric (*not specified*):				
From Austria-Hungary	5,500	.....	.....	.....
France	1,540	.....	118,140	.....
Germany	10,340	.....	.....	.....
Great Britain	15,180	.....	20,020	.....
Other countries	1,320	.....	220	.....
Totals	33,880	$20,805	138,380	$84,978
Tires:				
From France	3,960	.....	78,980	.....
Germany	440	.....	.....	.....
Great Britain	22,880	.....	37,620	.....
Other countries	660	.....	4,620	.....
Totals	27,940	$34,070	121,220	$147,817
Other rubber manufactures:				
From Austria-Hungary	5,500	.....	.....	.....
France	1,320	.....	350,460	.....
Germany	33,000	.....	.....	.....
Great Britain	26,620	.....	115,060	.....
Other countries	9,900	.....	104,060	.....
Totals	76,340	$33,482	569,580	$249,838
Total Imports	.....	$545,029	.....	$1,869,558

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Two Months Ending February, 1915.		Two Months Ending February, 1916.	
UNMANUFACTURED—	Pounds.	Value.	Pounds.	Value.
India rubber and gutta percha —raw and reclaimed	40,040	$8,957	202,180	$45,228
MANUFACTURED—				
India rubber and gutta percha —threads:				
To France	.....	.....	1,540	.....
Germany	5,720	.....	.....	.....
Great Britain	.....	.....	1,100	.....
Argentina	660	.....	1,320	.....
Other countries	3,520	.....	880	.....
Totals	9,900	$15,633	4,840	$7,643
India rubber and gutta percha —sheets:				
Cut sheets	1,980	$2,623	1,540	$2,040
Elastic fabric	660	203	.....	.....
Insulated wire	1,100	260	.....	.....
Hard rubber	8,800	5,404	25,300	15,536
India rubber and gutta percha —tubes:				
Cut sheets	.....	.....	6,380	$9,515
Elastic fabric	27,500	$11,821	16,720	6,787
Other forms	12,320	5,944	19,800	9,553
Belting	440	232	.....	.....
Elastic webbing:				
To France	440	.....	1,540	.....
Greece	8,360	.....	12,320	.....
Egypt	.....	.....	3,300	.....
Argentina	4,400	.....	16,060	.....
Brazil	12,980	.....	13,860	.....
Cuba	7,260	.....	4,620	.....
Other countries	8,580	.....	13,640	.....
Totals	42,020	$58,981	65,340	$91,714
Tires:				
To France	.....	.....	27,500	.....
Great Britain	.....	.....	1,021,240	.....
Switzerland	17,600	.....	27,500	.....
India and Ceylon	7,700	.....	49,500	.....
Australia	440	.....	20,240	.....
Argentina	86,460	.....	79,640	.....
Brazil	35,640	.....	8,580	.....
Other countries	626,780	.....	44,220	.....
Totals	774,620	$1,137,733	1,278,420	$1,558,917
Other rubber manufactures:				
To Switzerland	32,120	.....	4,180	.....
Great Britain	.....	.....	9,460	.....
Argentina	9,900	.....	16,280	.....
Other countries	66,440	.....	36,520	.....
Totals	108,460	$67,556	66,440	$41,383
Total Exports	1,027,840	$1,315,347	1,686,960	$1,788,316

THE RUBBER SCRAP MARKET.

NEW YORK.

THE adverse conditions surrounding the local market caused a break in the price of boots and shoes early in the month of June that resulted in lower values being quoted on the other grades in the list, with some exceptions, however. The weakness in the crude rubber market, together with the fact that rubber manufacturers and reclaimers alike were anticipating a quiet summer season, and the usual period of inventories, would naturally indicate easier conditions and lower prices. Moreover, the increasing volume of scrap arrivals released by the recent freight congestion is another potent reason for the unsettled tone of the market early in June. On Saturday of the first week, boots and shoes varied from 8⅝ to 8¾ cents, the former price being more representative of the actual business transacted with the mills. The other grades remained practically unchanged; G. & G. tires being quoted 8⅜ to 8½ cents, and mixed auto tires, 6⅜ cents, with little business resulting. Inner tubes were weak, the best quality was nominally quoted 27 to 28 cents delivered to the mills.

Toward the end of the month the belief was current among the large dealers that prices had reached the lowest level—a theory that was supported by a noticeable diminution in the arrivals of supplies—and therefore they were not anxious to sell. On June 28, boots and shoes were very sluggish at practically the same prices that have prevailed since the first of the month, 8⅝ cents delivered being the best price obtainable. Transactions in mixed auto tires were small in volume at 6¼ cents delivered, while the other grades remained unchanged. The balance of the list offered no unusual features worthy of recording, and the prevailing opinion is that for the next few weeks there will be no improvement in the rubber scrap business.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

JUNE 28, 1916.

Prices subject to change without notice.

	Per Pound.
Boots and shoes	$0.08¾ @ .08¾
Trimmed arctics	.07 @ .07½
White tires, Goodrich and Goodyear	.08¼ @ .08¾
Auto tires, standard white	.06¾ @ .0640
standard mixed	.06¾ @ .0640
stripped, unguaranteed	.04½ @ .04⅜
Auto peelings, No. 1	.09¾ @ .10
No. 2	.08¾ @ .08½
Inner tubes, No. 1	.26 @ .26½
No. 2	.11⅞ @ .12
red	.12 @ .12½
Irony tires	.02 @ .02⅛
Bicycle tires	.04¼ @ .430
Solid tires	.05¾ @ .05½
White scrap, No. 1	.14 @ .14½
No. 2	.10 @ .10½
Red scrap, No. 1	.10 @ .11
No. 2	.08 @ .09
Mixed black scrap, No. 1	.04 @ .04¼
No. 2	.03¾ @ .03⅞
Rubber car springs	.04 @ .04½
Horse shoe pads	.04½ @ .04⅝
Matting and packings	.01 @ .01¼
Garden hose	.01¼ @ .01½
Air brake hose	.05½ @ .05⅝
Cotton fire hose	.02½ @ .02⅝
Large hose	.01¾ @ .01⅞
Hard rubber scrap, No. 1, bright fracture	.24 @ .25
Battery jars (black compound)	.02½ @ .02⅞
Insulated wire stripping	.03 @ .03½
Rubber heels	.03¼ @ .04

MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

ACCORDING to the official government figures recently published, the cotton production in the United States for 1915, exclusive of linters, was 11,068,173 bales, the smallest grown since 1909, when the number of equivalent 500-pound bales was only 10,004,949. The crop for 1914, exclusive of linters, was 15,905,840 bales.

EGYPTIAN COTTON.

The Egyptian Government has taken steps to prevent the importation of dangerous cotton pests by prohibiting imports of cotton plants, cotton lint, cottonseed, seed cotton and cotton stalks. This law is much more drastic than the regulations provided by the United States Department of Agriculture to protect our cotton crop from imported disease.

SEA ISLAND COTTON.

The official figures for Sea Island cotton production in 1915, show that Florida produced 28,094 bales, Georgia, 57,572 bales, and South Carolina, 6,178 bales, a total of 91,844 bales. There was an increase of 10,000 bales compared to the 1914 crop, when 81,654 bales were produced, the crop being divided as follows: Florida, 33,662 bales; Georgia, 42,395 bales; South Carolina, 5,597. The estimated production of Sea Island cotton for 1916 is 100,000 bales.

TIRE FABRICS.

The demand for tire fabrics during the greater part of June, has continued to engage the utmost activities of the producers. Towards the end of the month, however, the smaller consuming trade was less importunate in its demands, which led to the belief in some quarters that tire fabrics were getting easier. This is not altogether verified, as the prices are ruling strong and show an increase over quotations made a month ago. This is the commencement of the usually quiet season, of shut-downs and inventory taking; moreover, the backward season and war rumors all conspire to make unusual market conditions that cannot be definitely explained. There has been no large source of production developed recently; raw material is high and labor still continues to be high and scarce. Therefore, it would seem that fundamentally the tire fabric situation is practically the same as it was a month ago.

COTTON DUCK.

Cotton duck still continues to be active, with a large demand for hose and belting duck. Prices have stiffened considerably, and an advance was expected during the last week of the past month. Price seems to be of secondary consideration, as the question of delivery takes precedence over all terms now being written in the contracts.

NEW YORK QUOTATIONS.

JUNE 28, 1916.

Prices subject to change without notice.

Aeroplane and Balloon Fabrics:			
Wamsutta, S. A. I. L. No. 1, 40-inch	*yard*	$0.25 @	
No. 4, 38½-inch		.25 @	
O/X B. 36-inch		.12¾ @	
Wool Stockinettes—52-inch:			
A—14-ounce	*yard*	1.12½ @	
B—14-ounce		1.25 @	
C—14-ounce		1.50 @	
Cotton Stockinettes—52-inch:			
D—14-ounce	*yard*	.49 @	.50
E—11½-ounce		.39 @	.40
F—14-ounce		.53 @	.54
G— 8-ounce		.43 @	.44
H—11-ounce		.48 @	.49
I— 9-ounce		.40½ @	.41½
Colors—white, black, blue, brown.			
Tire Fabrics:			
17¼-ounce Sea Island, combed	*square yard*	.77 @	.78
17¼-ounce Egyptian, combed		.66 @	.70
17¼-ounce Egyptian, carded		.63 @	.67
17¼-ounce Peelers, carded		.45 @	.50
Sheeting:			
40-inch 2.35-yard	*yard*	.10½ @	
40-inch 2.50-yard		.10 @	
40-inch 2.70-yard		.09¼ @	
40-inch 2.85-yard		.08¾ @	
40-inch 3.15-yard		.08½ @	
Osnaburgs:			
40-inch 2.25-yard	*yard*	.12 @	
40-inch 2.48-yard		.11 @	
37½-in. 2.42-yard		.11¼ @	
Mechanical Ducks:			
Hose	*pound*	.28 @	.29
Belting		.28 @	.29
Carriage Cloth Duck:			
38-inch 2.00-yard enameling duck	*yard*	.14 @	
38-inch 1.74-yard		.16 @	
72-inch 16.66-ounce		.33 @	
72-inch 17.21-ounce		.34 @	
Drills:			
38-inch 2.00-yard	*yard*	.14 @	
40-inch 2.47-yard		.11 @	
52-inch 1.90-yard		.15 @	
52-inch 1.95-yard		.14¼ @	
60-inch 1.52-yard		.20 @	
Yarns:			
Garden Hose, 12/2 cabled	*pound*	$0.28 @	.30
Fire Hose 12/1		.27 @	.29
Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:			
63-inch, 3¼ to 7½ ounces	*square yard*	.38 @	1.55
36-inch, 2¾ to 5 ounces		.35 @	.85
Imported Plaid Lining (Union and Cotton):			
63-inch, 2 to 4 ounces	*square yard*	.35 @	.75
36-inch, 2 to 4 ounces		.20 @	.45
Domestic Worsted Fabrics:			
36-inch, 4½ to 8 ounces	*square yard*	.25 @	.45
Domestic Woven Plain Linings (Cotton):			
36-inch, 3¼ to 5 ounces	*square yard*	.15½ @	.20
Raincoat Cloth (Cotton):			
Bombazine	*yard*	.06 @	.08
Twills		.10 @	.15
Tweed		.20 @	.35
Tweed, printed		.06 @	.15
Plaid		.08 @	.10
Repp		.18½ @	.25
Burlaps:			
32—7½-ounce	*100 yards*	6.30 @	
40—7½-ounce		6.75 @	
40—8-ounce		6.85 @	
40—10-ounce		8.15 @	
40—10½-ounce		8.30 @	
45—7½-ounce		7.80 @	
45—8-ounce		7.90 @	
48—10-ounce		12.50 @	

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK

THE market weakness shown during the past month by many chemicals and compounding ingredients and the decline in prices since April 1, is a strange anomaly. The sources of production have not materially changed and basic metals in general are still high, yet prices of many important chemicals used by the rubber trade have declined. This has been in a measure due to holders becoming uneasy and unloading. Many shipments long overdue, arrived and were sold in a quiet market, resulting in lower prices. Certain colors were weakened by the rumored

import of 15,000 tons of dyestuffs, but recovered and are now advancing. There is little doubt that price levels must be readjusted before the mills can be expected to support the market This is their quiet season and surplus stocks will be drawn upon to tide them over the summer season.

ANILINE OIL. The market for this month has been fairly firm since the decline in May, but weakness developed later in the month, due to delay in granting export shipping permits.

ANTIMONY SULPHURETS. Antimony metal has decreased in price and the best grades of sulphurets have been affected by an inferior quality being offered at lower prices. The demand is good and sales plentiful.

BARYTES. Supplies are scarce and present prices have been maintained by heavy demand. A new, large mine is being opened in the South for the production of prime white grade.

CAUSTIC SODA. The inquiry has been moderate. The large amount of resale stock has caused the market to settle.

LITHARGE. Prices have remained firm and unchanged.

LITHOPONE. The shortage of stocks has been marked by firm prices.

SULPHURIC ACID. The production of sulphuric acid, expressed in terms of 50 degree acid, in the United States in 1915, was 3,868,152 short tons, valued at $29,869,080, together with 189,795 short tons of oleum or fuming acid of different strengths, valued at $2,787,971, making a total of 4,057,947 short tons, valued at $32,657,051.

TALC. Shortage of imported talc has directed attention to the American product. Large quantities are being substituted for the French and Italian goods.

ZINC OXIDE. The New Jersey Zinc Co. has reduced the prices of three high grade brands of zinc 8 cents a pound, white seal to 17 cents, green seal to 16½ cents and red seal to 16 cents. This is due to the fact that spelter from which these grades are made, has declined. The lower grades made from lead ore have advanced on account of the high price of the ore.

NEW YORK QUOTATIONS.

JUNE 29, 1916.

Subject to change without notice.

Acetone (drums)	gal.	$0.95	@	$1.00
Acid, acetic, 28 per cent. (bbls.)	lb.	.06	@	.06¼
creasylic (crude)	gal.	.75	@	.80
glacial, 99 per cent (carboys)	lb.	.45	@	.50
muriatic, 20 degrees	lb.	.02½	@	
nitric, 36 degrees	lb.	.06	@	
sulphuric, 60 degrees	lb.	.01½	@	
Alumina Pigment, No. 1 (sacks)	ton	15.00	@	
Aluminum Flake (carloads)	ton	22.00	@	
Ammonium carbonate	lb.	.09½	@	.10
Antimony, crimson, sulphuret of (casks)	lb.	.75	@	
crimson, "Mephisto" (casks)	lb.	.75	@	
golden, sulphuret of (casks)	lb.	.40	@	.60
golden, "Mephisto"	lb.	.35	@	
golden, sulphuret, States brand, 16-17 per cent.	lb.	.50	@	
Asbestine	ton	19.50	@	21.00
Asbestos	ton	15.00	@	35.00
Asphaltum "G" Brilliant	lb.	.03½	@	
Barium sulphate, precipitated	lb.	.06½	@	.07
Barytes, pure white	ton	30.00	@	35.00
off color	ton	18.00	@	25.00
Basofor	ton	160.00	@	
Benzol, pure	gal.	.70	@	.80
Beta-Naphthol	lb.	1.25	@	1.50
Black Hypo	lb.	.45	@	1.00
Bone ash	lb.	None		
black	lb.	.04	@	.08
Cadmium tri-sulphate (f. o. b. London)	lb.	2.75	@	
yellow		None		
Cantella gum	lb.	.27½	@	.35
Carbon, bisulphide (drums)	lb.	.07	@	
black (cases)	lb.	.14	@	.20
tetrachloride (drums)	lb.	.20	@	
Caustic soda, 76 per cent.	lb.	.04½	@	.05
Chalk, precipitated, extra light	lb.	.04½	@	.05¼
precipitated, heavy	lb.	.04	@	.05
China clay, domestic	ton	10.00	@	15.00
imported	ton	40.00	@	50.00
Chrome, green	lb.	.20	@	.24
yellow	lb.	.35	@	
Coal tar	bbl.	4.50	@	
Corn oil, refined	cwt.	10.41	@	
Cotton linters	lb.	.06¾	@	
Gas black	lb.	.22	@	.25
Gilsonite	ton	37.50	@	
Glycerine, C. P. (drums)	lb.	.50	@	.57
Graphite, flake (400 pound bbl.)	lb.	.12	@	
powdered (400 pound bbl.)	lb.	.05	@	
Green oxide of chromium (casks)	lb.	.75	@	
Ground glass (fine)	bbl.	.02¾	@	
Indian red, reduced grades	lb.	.03¾	@	.06
pure	lb.	.07½	@	.09
Infusorial earth, powdered	ton	60.00	@	
bolted	ton	65.00	@	
Iron oxide, red, reduced grades	lb.	.03½	@	
red, pure, bright	lb.	.08½	@	.09
Ivory, black	lb.	.16	@	.30
Lampblack	lb.	.12	@	.18
Lead, red oxide of	lb.	.09¼	@	
sublimed blue	lb.	.08¾	@	
white, basic carbonate	lb.	.08¼	@	
white, basic sulphate	lb.	.08¾	@	
Lime, flour	lb.	.01¼	@	.01½
Litharge	lb.	.09¼	@	.11½
Lithopone, domestic	lb.	.10	@	.11
English	lb.	.12	@	.13
Imported	lb.	.14½	@	
Magnesia, carbonate	lb.	.19	@	.22
calcined, heavy	lb.	.40	@	.50
heavy, Thistle Brand	lb.	.14	@	
light	lb.	.45	@	.50
Magnesite, calcined, powdered	ton	Nominal		
Mica, powdered	lb.	.03¼	@	
Mineral rubber	lb.	.01	@	.02
"M. R. X."	ton	100.00	@	
"Genasco"	ton	36.50	@	
"L. M. R."	ton	50.00	@	
"Richmond Brand"	lb.	.03	@	
"No. 64 Brand"	ton	40.00	@	
Naphtha, stove gasolene (steel bbls.)	gal.	.24	@	
66@68 degrees "	gal.	.28	@	
68@70 degrees "	gal.	.29	@	
V. M. & P "	gal.	.23	@	
Oil, aniline	lb.	.60	@	.70
linseed (bbl.)	gal.	.64	@	
palm	gal.	.14½	@	.15
paraffin	gal.	.17	@	
pine (cases)	gal.	.70	@	
rapeseed	gal.	1.05	@	1.15
rosin, heavy body	gal.	.30	@	
tar (cases)	gal.	.20	@	
soluble aniline colors, yellow, orange, red, violet, blue, green	lb.	.10	@	.75
Orange mineral, domestic	lb.	.12	@	.12½
Paragol (carloads)	cwt.	9.29	@	
Petrolatum	lb.	.04	@	.04½
Petroleum grease	lb.	.04	@	.04½
Pine solvent		None		
Pine tar	bbl.	7.00	@	
Pitch, burgundy	lb.	.03¼	@	.03¾
pine	bbl.	3.50	@	
Plaster of paris	lb.	1.50	@	1.70
Prussian blue	lb.	1.95	@	
Pumice stone, powdered (bbls.)	lb.	.03	@	
Resin, Pontianak, refined	lb.	.18	@	
granulated	lb.	.15	@	
fused	lb.	.14	@	
Rosin (280 pound bbls.)	bbl.	6.30	@	7.50
Rotten stone, powdered	lb.	.02½	@	.04
Rubber black	lb.	.04½	@	
Rubber substitute, black	lb.	.08½	@	.12
white	lb.	.12½	@	.17½
brown	lb.	.13	@	.18
Rubhide		None		
Shellac, fine orange	lb.	.30	@	.34
Soapstone, powdered	ton	8.00	@	15.00
Starch, corn, powdered	lb.	.03¾	@	
Sulphur chloride (drums)	lb.	.08	@	.09½
Sulphur, flour, velvet, Brooklyn brand (carloads)	cwt.	2.15	@	
Talc, American	ton	8.00	@	15.00
French	ton	22.50	@	27.50
Toluol, pure	gal.	4.50	@	4.75
Tripolite earth, powdered	lb.	.02¼	@	.03½
bolted		None		
Turpentine, pure gum spirits	gal.	.45	@	
wood	gal.	.43	@	.45
Venice	gal.	.11	@	.12
Ultramarine blue	lb.	.10	@	.50
Vermilion, brilliant	lb.	1.00	@	1.25
Chinese	lb.	.95	@	1.00
English	lb.	1.50	@	1.60
Wax, bayberry	lb.	.21½	@	.23
beeswax, white	lb.	.50	@	.55
ceresin, white	lb.	.18	@	.20
carnauba	lb.	.27	@	.44
ozokerite, black	lb.	.60	@	.85
green	lb.	.80	@	.90
montan	lb.	.30	@	.32
paraffin, refined, 118/120 m. p. (cases)	lb.	.06½	@	
123/125 m. p. (cases)	lb.	.07	@	
128/130 m. p. (cases)	lb.	.08	@	
133/136 m. p. (cases)	lb.	.09½	@	
crude, white, 117/119 m. p. (bbls.)	lb.	.04	@	.04½
yellow, 124/126 m. p. (bbls.)	lb.	.05¼	@	
Whiting, Alba	cwt.	.55	@	.65
commercial	cwt.	.75	@	1.00
gilders	cwt.	.85	@	1.00
Paris, white, American	cwt.	.90	@	1.00
English cliffstone	cwt.	1.50	@	
Wood pulp XXX (carloads)	ton	22.00	@	
Yellow ochre (Satin)	lb.	.02	@	
Zinc oxide, American process, horsehead brand				
"special" f. o. b. factory	lb.	.10½	@	
"XX red" f. o. b. factory	lb.	.10	@	
French process, green seal, f. o. b. factory	lb.	.16½	@	
red seal, f. o. b. factory	lb.	.16½	@	
white seal, f. o. b. factory	lb.	.17¼	@	.26
Zinc sulphide, pure	lb.	.15	@	

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WIRING ASSEMBLY FOR FORD CARS.

There are many users of Ford cars, and a wiring assembly has been prepared expressly for any model car of this make, comprising timer wires and four spark plug wires. These timer wires are supplied in four individual colors fitted into the very best insulating loom. The timer terminals are finished with pure rubber insulated ferrules, thus eliminating any chance of short circuit. All the other ends have proper terminals with soldered connections, making an absolutely tight electrical joint. The loom ends are finished off with pure rubber insulating collars. The set is attractively packed in an individual carton. [Humboldt Machine & Stamping Co., Long Island City, New York.]